

حمل الآن

مجاناً وحصرياً

المراجعة رقم (1)

اختبار شهر مارس





Choose the correct answer for the questions 1 : 20

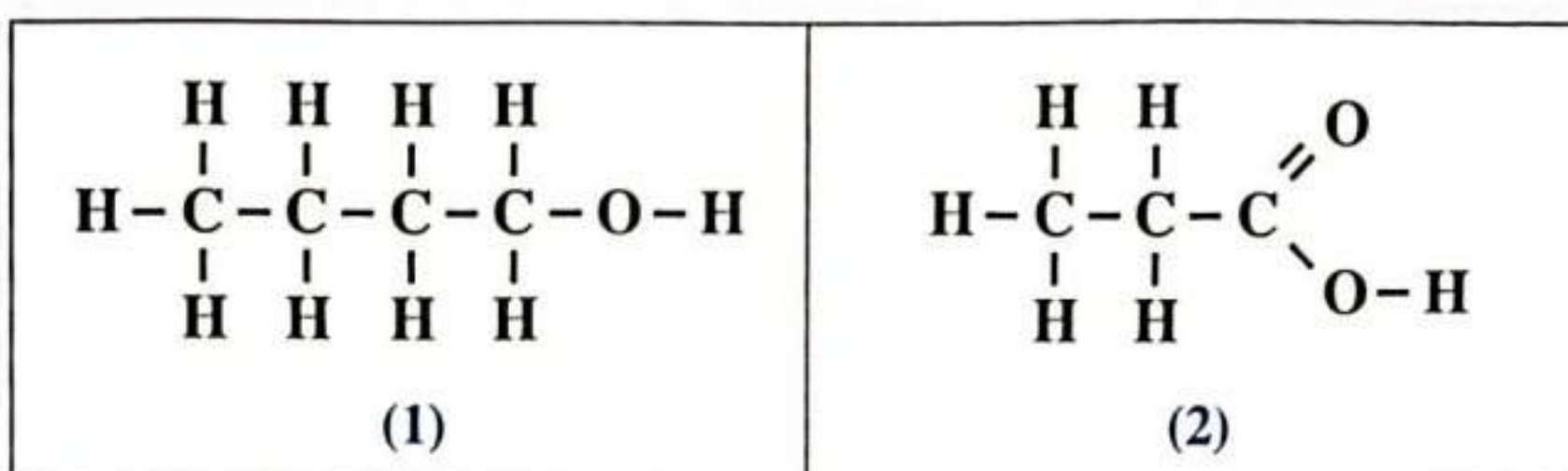
20 marks



1 The charge of ions that generate ionic currents which convert to electronic currents through an ECG device is

- (a) +1 only. (b) +2 only.
(c) +1 and +2 (d) +2 and +3

2 Here are two of the famous organic compounds.



Which of them contains hydrogen bonds among its molecules ?

- (a) (1) only. (b) (2) only.
(c) Both of them. (d) None of them.

3 Which of the following molecules contains 3 bond pairs of electrons ?

- (a) C_2H_4 (b) H_2S
(c) N_2 (d) SF_6

4 Which of the following orbitals in carbon atom its electron(s) do (does) not participate in forming (C – C) bond in ethane molecule C_2H_6 ?

- (a) 1s only. (b) 2s only.
(c) 2p only. (d) 2s and 2p

5 Which of the following molecules its correct structure cannot be explained without the concept of the hybrid orbitals ?

- (a) H_2 (b) CH_4
(c) HBr (d) Li_3N

6 The orbitals in each of the following molecules overlap, except in

- (a) NaCl (b) N_2
(c) C_2H_4 (d) NH_3

7 Which of these bonds is the most polar ?

[The electronegativities of the elements are : N = 3 , Bi = 1.8 , Sb = 1.9 , As = 2 , P = 2.1]

- (a) N – Bi (b) N – Sb (c) N – As (d) N – P

8 Which of the following represents H_2S molecule ?

- (a) Its stereostructure is angular.
(b) It contains one lone pair of electrons.
(c) The angle between its bonds is 180°
(d) It contains 6 bond electrons.

9 Which of the following is the correct graduation of the molecules according to the ionic character ?

- (a) $\text{KF} > \text{LiCl} > \text{HBr} > \text{HF}$ (b) $\text{HBr} > \text{KF} > \text{HF} > \text{LiCl}$
(c) $\text{HBr} > \text{HF} > \text{KF} > \text{LiCl}$ (d) $\text{KF} > \text{LiCl} > \text{HF} > \text{HBr}$

10 What is the number of single electrons in Lewis electron-dot symbol of the atom of an element whose electron configuration ends with $3p^4$?

- (a) Zero. (b) 1 (c) 2 (d) 4

11 In CS_2 molecule, the central carbon atom binds to each of the two sulphur atoms with

- (a) 1 σ bond only. (b) 1 σ bond and 1 π bond.
(c) 2 π bonds. (d) 2 σ bonds.

12 Which of the following represents the arrangement of the mentioned molecules according to the values of the angles between the bonds ?

- (a) $\text{CH}_4 < \text{BF}_3 < \text{NH}_3$ (b) $\text{H}_2\text{O} < \text{CO}_2 < \text{BF}_3$
(c) $\text{NH}_3 < \text{CH}_4 < \text{CO}_2$ (d) $\text{NH}_3 < \text{CH}_4 < \text{H}_2\text{O}$

13 Which of the following pairs contains both covalent bonds and coordinate bonds ?

- (a) NH_3 , NH_4^+ (b) PH_4^+ , H_3O^+ (c) H_3O^+ , H_2O (d) H_2O , HCl

14 Element (X) reacts with dilute hydrochloric acid forming the salt (Y) with the evolution of hydrogen gas.

What is the type of bonding in each of element (X) and salt (Y) respectively ?

- (a) Covalent / Covalent. (b) Metallic / Ionic.
(c) Metallic / Covalent. (d) Covalent / Ionic.

15 Both the molecules of water and methane are similar in

- (a) the value of the angle between the bonds.
- (b) the stereostructure.
- (c) the arrangement of the electron pairs.
- (d) the difference in electronegativity between their elements.

16 All the following are correct about NH_3 molecule, except

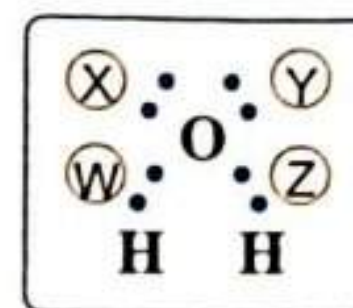
- (a) the hybridization in the central atom is sp^3
- (b) its stereostructure is tetrahedron.
- (c) its abbreviation is AX_3E
- (d) the angle between the bonds in it is 107°

17 All the following describe the molecule represented by the abbreviation AX_2E , except

- (a) the hybridization in its central atom is of the type sp^2
- (b) its stereostructure is angular.
- (c) its electron pairs arrangement is planar triangle.
- (d) there are 4 regions of electron density around A

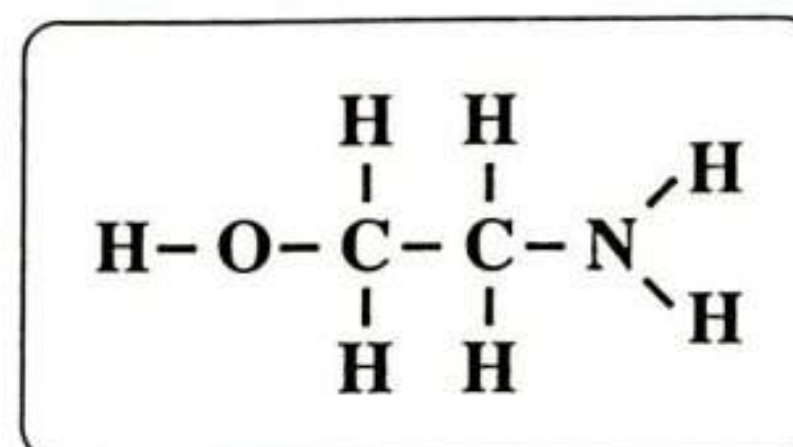
18 In the shown water molecule, the repulsion forces are the strongest between the two pairs of electrons

- (a) W and X
- (b) Y and X
- (c) Y and Z
- (d) W and Z



19 In the molecule illustrated in the opposite figure :
How many lone pairs of electrons are found ?

- (a) 1 pair.
- (b) 2 pairs.
- (c) 3 pairs.
- (d) 4 pairs.



20 What is the type of bonding between the two atoms of the elements ($_3\text{X}$) and ($_8\text{Y}$), when they form a compound ?

What is the formula of this compound ?

- (a) Ionic bonding / X_2Y
- (b) Covalent bonding / X_2Y
- (c) Ionic bonding / Y_2X
- (d) Covalent bonding / Y_2X

Answer the essay questions 21 : 23

21 Illustrate Lewis dot diagram of the valence electrons in PCl_3 molecule.

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.....

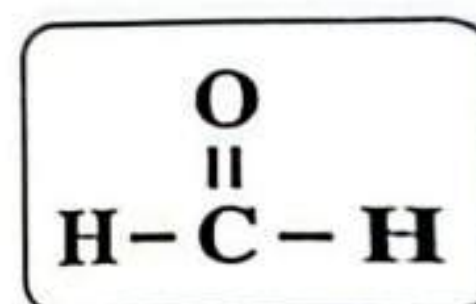
22 Why does aluminum $_{13}\text{Al}$ has higher melting point than potassium $_{19}\text{K}$?

.....

.....

.....

23 In the molecule illustrated in the opposite figure,
carbon forms 3 σ bonds and 1 π bond :



(1) Show (by drawing) the distribution of the electrons
in an excited carbon atom, and their distribution
in the hybrid atom, with mentioning the type of hybridization.

.....

.....

.....

(2) Determine the orbital in carbon atom which is used to form π bond.

.....

.....

.....

(13) 70% of produced lithium is used in manufacturing , while more than 90% of produced potassium is used in manufacturing

(14) Sodium hydroxide is known commercially as , and hydrated sodium carbonate is known as

4 What is the colour produced during the dry test of :

- | | | |
|---------------|-------------|----------------|
| (1) Lithium. | (2) Sodium. | (3) Potassium. |
| (4) Rubidium. | (5) Cesium. | |

5 What is the number of the alkali metals which reacts with oxygen yielding :

- | | | |
|------------------|--------------------|------------------|
| (1) Oxide M_2O | (2) Oxide M_2O_2 | (3) Oxide MO_2 |
|------------------|--------------------|------------------|

6 What happens when :

- (1) Light falls on cesium surface in photo-electric cells.
- (2) The valence electrons of a metal are excited.
- (3) A piece of sodium is left in air.
- (4) CO_2 gas is passed on a filter containing a superoxide compound and a suitable catalyst.
- (5) Sodium fire is extinguished by water.
- (6) Chile saltpetre is used in making gunpowder.
- (7) Calcium chloride is added to sodium chloride during its melting.

7 What is meant by :

- | | |
|-------------------------------|----------------------------|
| (1) Photoelectric phenomenon. | (2) Hygroscopic substance. |
|-------------------------------|----------------------------|

8 Mention one use for :

- | | |
|---|--|
| (1) Photo-electric cells. | (2) Potassium nitrate salt. |
| (3) Calcium chloride in sodium preparation. | |
| (4) Downs cell. | (5) Lithium - aluminum alloy. |
| (6) Sodium vapour lamps. | (7) Liquid sodium in nuclear reactors. |
| (8) Closed breathing device. | (9) Rubidium bromide. |
| (10) Cesium. | (11) Washing soda. |

Questions for the general stream and Al-Azhar students



Multiple choice questions (MCQ)



Abundance of alkali metals in nature

1 The molecular formula of carnallite is

- | | |
|--------------------|------------------------|
| (a) $ClH_{12}KMgO$ | (b) $Cl_3H_{12}KMgO_6$ |
| (c) Cl_3H_2KMgO | (d) $KCl.MgCl.6H_2O$ |

2 Upon heating 0.5 mol of carnallite, g of its mass is lost. [H = 1, O = 16]
 (a) 90 (b) 54 (c) 72 (d) 108

3 The oxidation number of the first group elements in their compounds is
 (a) -1 (b) +1 (c) -2 (d) +2

General properties of alkali metals

4 The chemically active metal

- (a) loses its valence electrons easily.
- (b) forms unstable compounds.
- (c) burns in air easily forming an acidic oxide.
- (d) forms an oxide which is easily reduced by carbon.

5 It is not normal for sodium to exist in the oxidation state +2, because of its

- (a) high first ionization potential.
- (b) high second ionization potential.
- (c) large ionic radius.
- (d) high electronegativity.

6 Alkali metals are characterized by their large

- (a) densities.
- (b) ionization potentials.
- (c) atomic radii.
- (d) electronegativities.

7 The ionic character increases in the first group elements by increasing

- (a) the percentage in earth's crust.
- (b) the boiling point.
- (c) the atomic number.
- (d) the melting point.

8 By comparing cesium and potassium, it is concluded that cesium

- (a) has less atomic mass.
- (b) has larger atomic size.
- (c) has lower ability to be ionized.
- (d) is less chemically active.

9 Which of the following elements loses its valence electron most easily ?

- (a) Li (b) Na (c) K (d) Cs

10 The similarity of the chemical properties of the alkali metals is attributed to that

- (a) they all have the same electron configuration of the nearest noble gas.
- (b) the valence electron of each of them has the same four quantum numbers.
- (c) the valence electron of each of them has the same energy.
- (d) the valence shell of each of them contains one electron.

11 Each of the following statements is correct, except

- (a) alkali metals are similar in their electronegativities.
- (b) lithium properties differ from some of magnesium properties.
- (c) photoelectric phenomenon of alkali metals increases by increasing the atomic number.
- (d) alkali metals are very strong reducing agents.

- 12** Which of the following about the alkali metals is correct ?
- The reactivity decreases by increasing the atomic number.
 - The melting point decreases by increasing the atomic number.
 - The first ionization potential increases by increasing the ionic radius.
 - The ionic radius increases by decreasing the atomic radius.
- 13** Which of the following about the melting points of the alkali metals is correct?
- Sodium > Lithium, as sodium has higher number of valence electrons.
 - Rubidium > Potassium, as the density of the charge of rubidium is larger.
 - Potassium > Sodium, as potassium has greater radius.
 - Lithium > Cesium, as the density of the charge of lithium is larger.
- 14** Which of the following salts its cation yields a yellowish green colour in the dry test?
- NaCl
 - LiCl
 - BaCO₃
 - K₂CO₃
- 15** When lithium reacts with nitrogen of the atmospheric air by heating, then water is added to the product, a gas evolves which is
- oxygen.
 - hydrogen.
 - nitric oxide.
 - ammonia.
- 16** Which of these hydroxides is the strongest ?
- NaOH
 - LiOH
 - RbOH
 - KOH
- 17** The combination of sodium with oxygen (at 300°C) produces an oxide containing the ion
- O⁺
 - O^{-1/2}
 - O⁻
 - O²⁻
- 18** What is the metal (X) which reacts with oxygen (at 180°C) to form the oxide M₂O?
- Lithium.
 - Sodium.
 - Rubidium.
 - Cesium.
- 19** The following metals can react with pure oxygen forming the oxide MO₂ except
- lithium.
 - potassium.
 - rubidium.
 - cesium.
- 20** The alkali metal oxide MO₂ acts as
- a reducing agent and reacts with acids.
 - a reducing agent and does not react with water.
 - an oxidizing agent and reacts with acids.
 - an oxidizing agent and does not react with water.
- 21** The compound of an alkali metal whose formula is XO₂ is
- a normal oxide and the metal oxidation number is (-1/2)
 - a peroxide and the metal oxidation number is (+1)
 - a superoxide and the metal oxidation number is (+1)
 - a superoxide and the oxygen oxidation number is (+1/2)

- 22 All the following chemical formulas represent peroxides, except
- (a) Na_2O_2 (b) H_2O_2 (c) KO_2 (d) BaO_2
- 23 RbO_2 is
- (a) a normal oxide. (b) a peroxide. (c) a superoxide. (d) an acidic oxide.
- 24 Metal (M) has the largest atomic size in its period, its electrons are distributed in 6 energy sublevels.
What is the chemical formula of (M) oxide which is formed when (M) is burnt in pure oxygen under high pressure ?
- (a) MO_2 (b) M_2O_2 (c) M_2O (d) MO
- 25 Three alkali metals (X), (Y) and (Z) react with oxygen as follows :
- $\text{X} \xrightarrow{\text{O}_2 / \Delta} \text{X}_2\text{O}$ • $\text{Y} \xrightarrow{\text{O}_2 / \Delta} \text{Y}_2\text{O}_2$ • $\text{Z} \xrightarrow[\text{P}]{\text{O}_2 / \Delta} \text{ZO}_2$
- Which of the following is correct ?
- (a) According to the chemical activity : $\text{Z} < \text{Y} < \text{X}$
(b) Z can be rubidium.
(c) Y_2O_2 is a strong reducing agent.
(d) According to the oxidation number : $\text{Z} < \text{Y} < \text{X}$
- 26 What is the chemical formula of the standard (normal) oxide of the alkali element (M) ?
- (a) M_2O_2 (b) MO (c) M_2O (d) M_2O_3
- 27 Alkali metal oxide MO_2 reacts with CO_2 forming
- (a) metal M carbonate and water. (b) metal M carbonate and oxygen.
(c) metal M bicarbonate and water. (d) metal M bicarbonate and oxygen.
- 28 What is the correct classification of cesium oxide ?
- (a) Very strong base. (b) Weak base.
(c) Acidic oxide. (d) Amphoteric oxide.
- 29 All the following about alkali metals hydrides are correct, except that.....
- (a) they are ionic compounds.
(b) they are produced from the reactions of alkali metals with hydrogen.
(c) the oxidation number of hydrogen in them is -1
(d) they are reduced during the reaction with water.
- 30 Which of these elements its reaction with alkali metals is accompanied by an explosion?
- (a) Hydrogen. (b) Sulphur. (c) Chlorine. (d) Phosphorus.

- 31 Which alkali metal can combine with nitrogen gas at room temperature?
 (a) Lithium. (b) Sodium. (c) Potassium. (d) Cesium.
- 32 Alkali metal (M) reacts directly with nitrogen.
 Which of the following is a property of this metal compared to other group metals?
 (a) It has the largest ionic radius.
 (b) It has the highest melting point.
 (c) It has the greatest density.
 (d) It has the highest number of valence electrons.
- 33 All alkali carbonates melt by strong heating without decomposition, except
 (a) lithium carbonate. (b) sodium carbonate.
 (c) potassium carbonate. (d) cesium carbonate.
- 34 All the following reactions occur vigorously, except
 (a) the decomposition reaction of potassium nitrate.
 (b) the reaction of sodium with chlorine.
 (c) the reaction of potassium with water.
 (d) the reaction of lithium with nitrogen.
- 35 Each of the following represents the alkali metal (X) whose electrons are distributed in two energy levels, except that
 (a) its carbonate salt decomposes by heat.
 (b) it has the least ionization potential in its period.
 (c) it reacts with water forming an alkaline solution.
 (d) it has the largest radius among its group elements.
- 36 All the following alkali metals carbonates are thermally stable, except
 (a) Li_2CO_3 (b) Na_2CO_3 (c) K_2CO_3 (d) Cs_2CO_3
- 37 Heating sodium nitrate produces
 (a) NO gas. (b) NO_2 gas. (c) N_2O gas. (d) O_2 gas.
- 38 Sodium carbonate is similar to lithium carbonate in
 (a) the effect of the strong heat on both of them.
 (b) the gas produced from their reactions with the acids.
 (c) their melting points.
 (d) the colour formed during the dry test.
- 39 Chile saltpetre is similar to saltpetre in all the following, except
 (a) the number of molecule atoms. (b) the charge of the molecule.
 (c) the cation substance. (d) the anion substance.

Extraction of alkali metals from their ores

- 40** Sodium metal is extracted in industry by the electrolysis of
- (a) sodium chloride solution. (b) molten sodium chloride.
(c) caustic soda solution. (d) molten caustic potash.
- 41** Downs cell is used in
- (a) extracting nitrogen from atmospheric air. (b) preparing nitric acid.
(c) extracting sodium from sodium chloride. (d) preparing sodium hydroxide.
- 42** In Downs cell,
- (a) chloride ions are oxidized at the anode. (b) sodium ions are oxidized at the anode.
(c) chloride ions are reduced at the cathode. (d) hydrogen ions are reduced at the cathode.
- 43** What are the oxidizing agent and the reducing agent in the electrolysis of sodium chloride melt respectively ?
- (a) Cl / Na (b) $\text{Cl}^- / \text{Na}^+$ (c) $\text{Na}^+ / \text{Cl}^-$ (d) Na / Cl

كيفية طباعة صفحات معينة من ملف معين مثلا ازاي نطبع الصفحات من صفحة 4 الى صفحة 9



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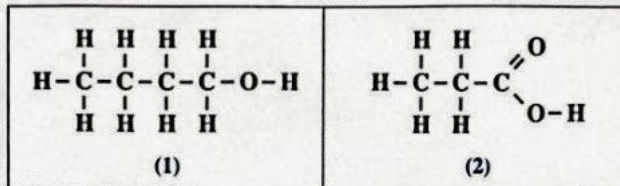
المراجعة رقم (2)

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Here are two of the **famous organic compounds** Which of them contains hydrogen bonds among its molecules ?



- ☐ (1) only.
- ☐ (2) only.
- ☐ Both of them.
- ☐ None of them.



Which of the following molecules contains
3 bond pairs of electrons ?



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Which of the following orbital's in carbon atom its electron(s) do (does) not participate in forming (C —C) bond in ethane molecule C_2H_6 ?

- ☐ 1s only.
- ☐ 2s only.
- ☐ 2p only.
- ☐ 2s and 2p



Which of the following molecules its correct structure cannot be explained without the concept of the **hybrid orbitals** ?





The orbitals in each of the following molecules overlap, **except in**



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Which of these bonds is the most polar ?

The electro negativities of the elements are:

(N = 3.0 Bi = 1.8 Sb = 1.9 As = 2.0 , P=2.1)

☐ N – Bi

☐ N – Sb

☐ N – AS

☐ N – P



Which of the following represents H_2S molecule ?

- Its stereo structure is angular.
- It contains one lone pair of electrons.
- The angle between its bonds is 180°
- It contains 6 bond electrons.



Which of the following is the correct graduation of the molecules according to the ionic character ?

☐ $\text{KF} > \text{LiCl} > \text{HBr} > \text{HF}$

☐ $\text{HBr} > \text{KF} > \text{HF} > \text{LiCl}$

☐ $\text{HBr} > \text{HF} > \text{KF} > \text{LiCl}$

☐ $\text{KF} > \text{LiCl} > \text{HF} > \text{HBr}$



What is the number of **single electrons** in Lewis electron - dot symbol of the atom of an element whose electron configuration ends with $3p^4$?

☐ Zero

☐ 1

☐ 2

☐ 4

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In CS_2 molecule, the central carbon atom binds to each of the two sulphur atoms with

- 1 σ bond only.
- 1 σ bond and 1 π bond.
- 2 π bonds.
- 2 σ bonds.



Which of the following represents the arrangement of the mentioned molecules according to the values of the angles between the bonds ?

- $\text{CH}_4 < \text{BF}_3 < \text{NH}_3$
- $\text{H}_2\text{O} < \text{CO}_2 < \text{BF}_3$
- $\text{NH}_3 < \text{CH}_4 < \text{CO}_2$
- $\text{NH}_3 < \text{CH}_4 < \text{H}_2\text{O}$



Which of the following pairs contains both
covalent bonds and **coordinate bonds** ?

- ☐ $\text{NH}_3, \text{NH}_4^+$
- ☐ $\text{PH}_4^+, \text{H}_3\text{O}^+$
- ☐ $\text{H}_3\text{O}^+, \text{H}_2\text{O}$
- ☐ $\text{H}_2\text{O}, \text{HCl}$



Element (X) reacts with dilute hydrochloric acid forming the salt (Y) with the evolution of hydrogen gas.

What is the type of bonding in each of element (X) and salt (Y) respectively ?

- Covalent / Covalent.
- Metallic / Ionic.
- Metallic / Covalent.
- Covalent / Ionic.



Both the **molecules of water** and methane are similar in

- the value of the angle between the bonds.
- the stereo structure.
- the arrangement of the electron pairs.
- the difference in electro negativity between their elements.



All the following are correct about NH_3 molecule, except

- the hybridization in the central atom is sp^3
- its stereostructure is tetrahedron.
- its abbreviation is $\text{AX}^3 \text{E}$
- the angle between the bonds in it is 107°

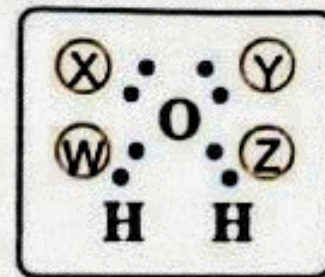


All the following describe the molecule represented by the abbreviation AX_2E , except

- the hybridization in its central atom is of the type sp^2
- its stereostructure is angular.
- its electron pairs arrangement is planar triangle.
- there are 4 regions of electron density around A



In the shown water molecule, the repulsion forces are the strongest between the two pairs of electrons

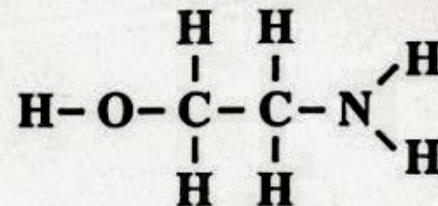


- ☐ W and X
- ☐ Y and X
- ☐ Y and Z
- ☐ W and Z



In the molecule illustrated in the opposite figure :

How many lone pairs of electrons are found ?



- ☐ 1 pair.
- ☐ 2 pairs.
- ☐ 3 pairs.
- ☐ 4 pairs.



What is the type of bonding between the two atoms of the elements ($_3X$) and ($_8Y$), when they form a compound ?

What is the formula of this compound ?

- Ionic bonding / X_2Y
- Covalent bonding / X_2Y
- Ionic bonding / Y_2X
- Covalent bonding / Y_2X



Illustrate Lewis dot diagram of the valence electrons in PCl_3 molecule.

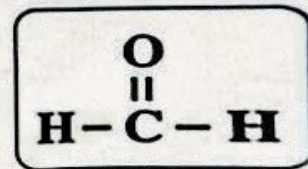
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Why does aluminum $_{13}\text{Al}$ has higher melting point than potassium $_{19}\text{K}$?

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In the molecule illustrated in the opposite figure, carbon forms 3 σ bonds and 1 π bond :



- 1 Show (by drawing) the distribution of the electrons in an excited carbon atom, and their distribution in the hybrid atom, with mentioning the type of hybridization.
- 2 Determine the orbital in carbon atom which is used to form π bond.



The **molecular formula** of carnallite is

.....

- ☐ $\text{ClH}_{12}\text{KMgO}$
- ☐ $\text{Cl}_3\text{H}_{12}\text{KMgO}_6$
- ☐ $\text{Cl}_3\text{H}_2\text{KMgO}$
- ☐ $\text{KCl.MgCl.6 H}_2\text{O}$



It is not normal for sodium to exist in the oxidation state +2, **because of its**

- high first ionization potential.
- high second ionization potential.
- large ionic radius.
- high electronegativity.



Which of the following elements **loses its valence electron** most easily ?



Li



Na



K



Cs

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Which of the following salts its cation yields a yellowish green colour in the **dry test**

☐ NaCl

☐ LiCl

☐ BaCO₃

☐ K₂CO₃

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at is the metal (**X**) which reacts with oxygen
(**at 180°C**) to form the oxide **M₂O**?

- ☐ Lithium.
- ☐ Sodium.
- ☐ Rubidium.
- ☐ Cesium



The alkali metal oxide MO_2 acts as

- ☐ a reducing agent and reacts with acids.
- ☐ a reducing agent and does not react with water.
- ☐ an oxidizing agent and reacts with acids.
- ☐ an oxidizing agent and does not react with water.



The compound of an alkali metal whose formula is XO_2 is

- a normal oxide and the metal oxidation number is $(-1/2)$
- a peroxide and the metal oxidation number is $(+1)$
- a superoxide and the metal oxidation number is $(+1)$
- a superoxide and the oxygen oxidation number is $(+1/2)$

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المراجعة رقم (3)

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REVISION QUESTIONS ON LESSON 1 CHAPTER 1

1) An element with electron configuration $[\text{Ne}] 3s^2 3p^6$ is

- a- Diatomic inert element
- b- Monatomic metallic element
- c- Monatomic inert element
- d- Diatomic non metallic element

2) Elements X,Y&Z have following configuration :

X	Y	Z
$1s^2 2s^2 2p^6$	$[\text{Ar}] 4s^1$	$[\text{Ne}] 3s^2 3p^5$

So.....

- a- Y reacts with Z , X reacts with Y
- b- Y reacts with Z , X doesn't react with Z
- c- Y doesn't react with Z , X reacts with Z
- d- Y reacts with X , X reacts with Z

3) This shown diagram represents Lewis electron-dot symbol of the element.....

- a- ${}_{14}\text{A}$
- b- ${}_{34}\text{B}$
- c- ${}_{38}\text{C}$
- d- ${}_{53}\text{D}$



4) What is the number of the single electrons in Lewis electron-dot diagram of ${}_{7}\text{N}^{3-}$ ion?

a- Zero

b- 1 e^{-}

c- 2 e^{-}

d- 3 e^{-}

5) What is the number of the electrons which share in the bond between the two carbon atoms in the molecule $\text{H}_2\text{C} = \text{CH}_2$?

a- 2

b- 3

c- 4

d- 6

6) What is the number of the lone pairs of electrons on arsenic atom ${}_{33}\text{As}$ in arsine AsH_3 ?

a- Zero

b- 1

c- 2

d- 3

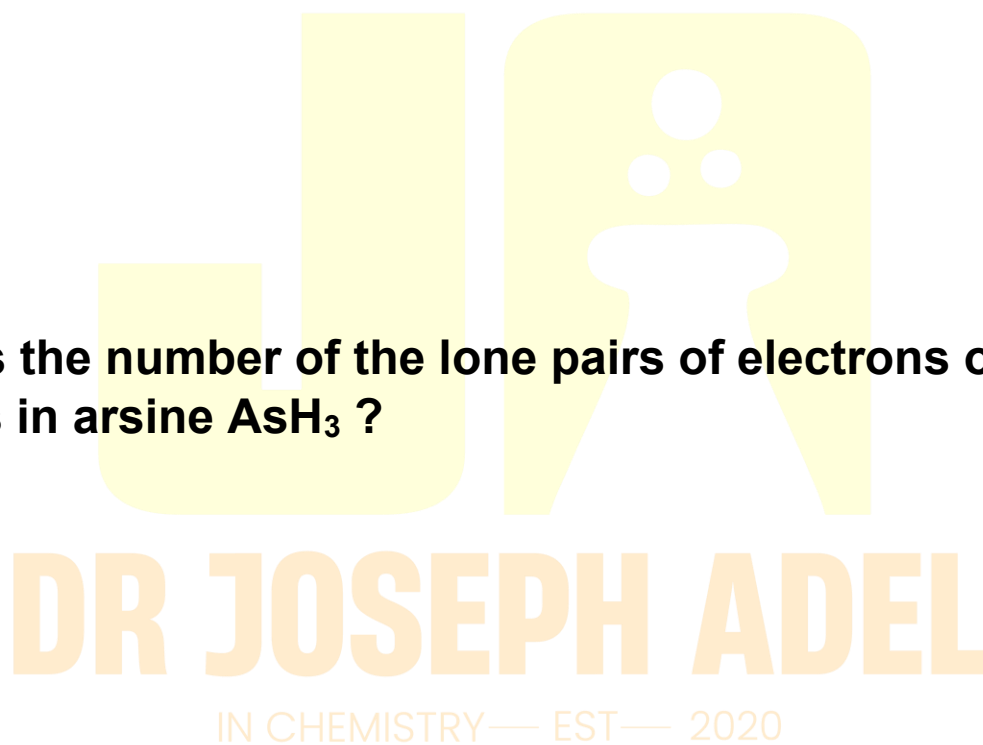
7) Which of the following molecules includes three bond pairs ?

a- HBr

b- H_2O

c- NF_3

d- O_2



8) Among the elements ${}_9\text{A}$, ${}_{10}\text{B}$, ${}_{11}\text{C}$ and ${}_{19}\text{D}$, the two elements that can combine together are.....

- a- B and C
- b- C and D
- c- A and B
- d- A and C

9) Among the ionic compounds is.....

- a- CH_3Cl
- b- KNO_3
- c- CH_4
- d- HCl

10) Which of the following has a distinct ability to conduct the electric current?

- a- $\text{NaCl}_{(\text{s})}$
- b- $\text{KCl}_{(\text{l})}$
- c- $\text{AlCl}_{3(\text{l})}$
- d- $\text{CCl}_{4(\text{l})}$

11) The elements W, X, Y and Z are located in the same period in the periodic table. Which of the chlorides of these elements has the highest melting and boiling points?

- a- WCl_4
- b- XCl_3
- c- YCl_2
- d- ZCl

12) The charge of ions that create ionic currents which are converted into electronic currents through the ECG device is

.....

- a- +1 only
- b- +2 only
- c- +1 & +2
- d- +2 & +3

13) When two atoms of an element whose atomic number is (9) combine together, then the bond in the produced molecule will be.....

- a- Polar covalent
- b- Ionic
- c- Pure covalent
- d- Metallic

14) In which molecule do the bond electrons spend equal times in the vicinity of each of two bonded atoms?

- a- O₂
- b- MgO
- c- HI
- d- HBr

15) In terms of the opposite table:

Element	H	C	N	O
Electronegativity	2.1	2.5	3	3.5

Which of the following bonds is not polar?

- a- C-H
- b- N-H
- c- O-H
- d- C-O

16) All of the following are properties of covalent compounds except.....

- a- The attraction force between their molecules are weak.
- b- Most of them are soluble in organic solvents.
- c- Most of its chemical reactions are slow.
- d- Its molten or solutions are good conductor of electricity.

17) Which of the following molecules is more polar ? Knowing that the electronegativities of their elements are:

[H = 2.1, N=3, O=3.5, F=4]

- a- NH₃
- b- NF₃
- c- NO₂
- d- HF

18) The bond between titanium metal and chlorine metals in titanium tetrachloride is.....

- a- pure covalent
- b- Ionic
- c- Polar covalent
- d- Nonpolar covalent

19) Which of the following conducts the electricity?

- a- $\text{KCl}_{(s)}$
- b- $\text{HCl}_{(g)}$ dissolved in benzene
- c- $\text{HCl}_{(aq)}$
- d- C_2H_4 dissolved in carbon tetrachloride

20) Determining the active part of a drug used for viral diseases requires

- a- Estimating the molecular mass of the drug only after its binding with the virus protein.
- b- Estimating the molecular mass of the drug before and after its binding with the virus protein.
- c- Not estimating the molecular mass of the drug only before its binding with the virus protein.
- d- Not estimating the molecular mass of the drug before and after its binding with the virus protein.

21) Three elements (W), (X) and (Y) :

Element (W) : Its electrons are distributed in 3 sublevels;
the last sublevel is half filled.

Element (X) : Its atomic number exceeds that of (W) by 2

Element (Y) : Its electron configuration ends with the sublevel $3s^1$

(1) Draw Lewis dot diagram of the compound composed of (W) and (X) elements.

(2) What is the type of the bond which results from the combination of (X) and (Y) ?

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22) Based on the elements: (${}_3\text{A}$, ${}_6\text{B}$, ${}_{33}\text{C}$, ${}_{37}\text{D}$)

Determine the elements which react with chlorine forming:

(1) A molecule that contains more than one bond pair.

(2) A compound that has the highest melting point.

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23) In terms of the following table which shows the electronegativities of some elements:

H	Na	Cl	Ca	K	Mg	C	Br	N	P	I	F	O
2.1	0.9	3	1	0.8	1.2	2.5	2.8	3	2.1	2.5	4	3.5

Arrange the following bonds in an ascending order according to the graduation in :

(1) Ionic strength: (NaCl) , (KCl) , (CaCl₂) , (MgCl₂)

(2) Polarity of bond: (P-Cl) , (N-O) , (H-H) , (C=O) , (H-Cl)

(3) Polarity of compound: H₂ , H₂O , NF₃ , NH₃

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REVISION QUESTIONS ON LESSON 2 CHAPTER 1

24) All of the following compounds obey the octet rule except.....

- a- NF_3
- b- PF_3
- c- IF_3
- d- SbF_3

25) The structures of the following molecules violate the octet rule except.....

- a- CCl_4
- b- SF_6
- c- BCl_3
- d- AlCl_3

26) The Valence Bond Theory applies to the compound.....

- a- NO_2
- b- BH_3
- c- P_2O_5
- d- PCl_3

27) Lewis-Kossel theory applies to the molecule.....

- a- NO
- b- ClO_2
- c- OCl_2
- d- BH_3

28) Which of the following represents the correct dot (Lewis) structure of CO_2 molecule?



29) The total number of electron pairs in the following molecules is equal, except in molecule.....



30) The number of bond pairs is equal in the following molecules, except in molecule.....



31) How many electrons lone pairs are found on the central atom in PCl_5 molecule?



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32) What is the total number of each of the electron bond pairs and lone pairs in PCl_5 molecule?

- a- 5 bond pairs and 10 lone pairs.
- b- 10 bond pairs and 5 lone pairs.
- c- 5 bond pairs and 15 lone pairs.
- d- 15 bond pairs and 5 lone pairs.

33) Lewis and Kosele theory can be applied to the molecule of

- a- PCl_3
- b- PCl_5
- c- BF_3
- d- BCl_3

34) The Theory which proposed that the formation of the covalent bond is a result of the overlapping of an atomic orbital of one atom which contains a single electron with a similar orbital of another atom is the

- a- Octet rule.
- b- Valence bond theory.
- c- Molecular orbital theory.
- d- Hybridization.

35) According to Valence bond theory: Which of the following orbitals undergo overlapping to form bromine molecule Br_2 ?

- a- 3s
- b- 3p
- c- 4s
- d- 4p

36) According to Valence bond theory:

Which of the following orbitals which overlap together to form the bond in HCl molecule?

- a- 1s of H and 3s of Cl.
- b- 1s of H and 3p_z of Cl.
- c- 2s of H and 3p_z of Cl.
- d- 2s of H and 3p_y of Cl.

37) The sp³ hybrid orbital is formed from the overlap of.....

- a- 1 s orbital with 3 p orbitals
- b- 1 s orbital with 1 p orbital
- c- 2 s orbitals with 2 p orbitals
- d- 1 s orbital with 2 p orbitals

38) The type of hybridization is the same in each of the following pairs.....

- a- NH₃, CH₄
- b- C₂H₄, NH₃
- c- C₂H₂, C₂H₄
- d- C₂H₂, CH₄

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39) In which of the following molecules does excitation of the central atom occur before sp³ hybridization takes place?

- a- H₂O
- b- C₂H₄
- c- SiCl₄
- d- NH₃

40) All of the following molecules undergo sp^3 hybridization of the central atom except.....

- a- NH_3
- b- H_3O^+
- c- CH_4
- d- CO_2

41) Element (X) has its electron configuration ending in the sublevel $2p^3$. All of the following statements are correct concerning element (X), except.....

- a- It can be a central atom in the molecule XH_3 .
- b- It forms the ions XO_2^- and XO_3^- .
- c- It forms a diatomic molecule.
- d- Its valence shell contains 3 electrons.

42) When the hybridization in the central atom of the molecule is sp^3 , its structure in the space will be.....

- a- Tetrahedron.
- b- Three-base pyramid.
- c- Planer Triangle.
- d- Angular.

43) What is the number of the single electrons in a stable carbon atom?

- a- 1
- b- 2
- c- 3
- d- 4

44) GIVE REASON:

The drawbacks of the octet Rule.

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45) GIVE REASON:

The octet rule can't be applied to boron trifluoride molecule.

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**46) DRAW THE STRUCTURE OF THE FOLLOWING MOLECULES,
SHOWING THE ELECTRON DOT DIAGRAMS
(LONE AND BOND PAIRS):**

(1) Ethane C_2H_6

(2) Tetrachloromethane CCl_4

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REVISION QUESTIONS ON LESSON 3 CHAPTER 1

47) How many pairs of free electrons does an atom of Arsenic $_{33}\text{As}$ in the Arsenic compound AsH_3 ?

a- zero

b- 1

c- 2

d- 3

48) In a molecule OF_2 , the angle between the bonds is.....

a- 109.5

b- Greater than 109.5

c- Less than 109.5

d- 180

49) What is the stereostructure of the CHCl_3 molecule?

a- angular

b- a planar triangle

c- tetrahedral

d- a triangular pyramid

50) Hydrazine molecule N_2H_4 consists of..... bonding pairs, and..... free pairs.

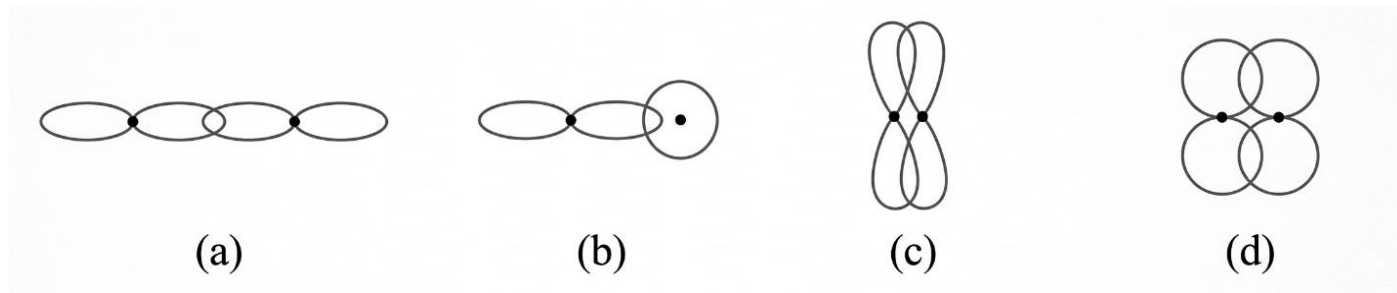
a- 4/2

b- 2/4

c- 5/2

d- 6/2

51) Which of the following figures represents the overlapping of the orbitals to form π bond?



52) In the following diagram:

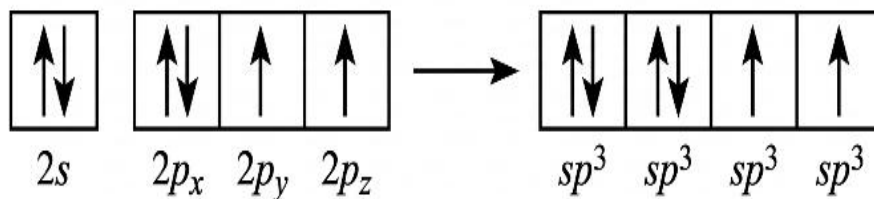
what is the correct arrangement of energies of the orbitals?

a- $2p_z > 2s > sp^3$

b- $sp^3 > 2p_z > 2s$

c- $2s > 2p_x > sp^3$

d- $2p_x > sp^3 > 2s$



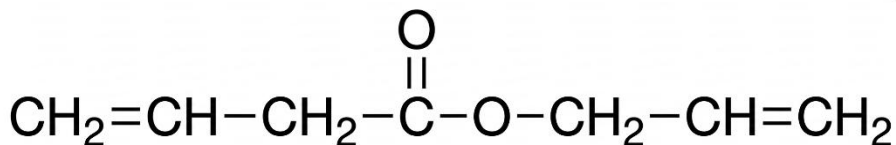
53) How many sigma bonds are in the corresponding compound ?

a- 15

b- 17

c- 18

d- 21



54) The sp^2 hybrid orbitals have the following properties except.....

- a- Its shape is a planar triangle
- b- Is three hybridized orbitals
- c- It can occur in a carbon atom C_2Cl_2
- d- The angles between orbitals are 120

55) The sigma bond between the carbon and chlorine atoms in the chloromethane molecule CH_3Cl arises from overlapping

.....

- a- sp^3 with sp^1
- b- sp^3 with p_z
- c- sp with sp
- d- sp with s

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56) Which of the following molecule has its atoms excited before hybridization process?

- a- N_2
- b- NH_3
- c- H_2
- d- $CHCl_3$

57) When an orbital from sub-level 2s of an atom with 3 orbitals from sub-level 2p of the same atom after being excited, hybrid orbitals form, forming a molecule that takes the form of space.....

a- tetrahedron

b- linear

c- planar triangle

d- triangular pyramid

58) In which of the following molecules the angle between the bond is greatest.....

a- CO_2

b- BF_3

c- CCl_4

d- NF_3

59) Resultant net dipole moment to zero in a compound.....

a- NH_3

b- NO_2

c- H_2O

d- BeF_2

60) What type of hybridization occurs on the carbon atom in the compound HCN?

- a- sp
- b- sp^2
- c- sp^3
- d- dsp^2

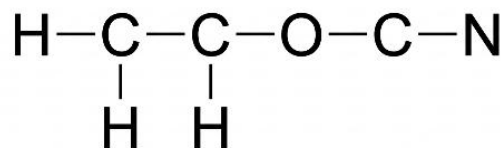
61) All the following molecules are polar, except.....

- a- CH_4
- b- PCl_3
- c- HBr
- d- CH_3Cl

62) The molecule in the opposite figure is incomplete.

What is the number of the lone pairs of electrons in this molecule after completing it with the suitable number of bond pairs of electrons?

- a- Zero.
- b- 1
- c- 2
- d- 3



63) BCl_3 has a planar triangle stereo structure, while that of NCl_3 is three-base pyramid, because

- a- N-Cl bond is more covalent than B-Cl bond
- b- B-Cl bond is more polar than N-Cl bond.
- c- nitrogen atom is smaller than boron atom.
- d- The central atom in BCl_3 molecule does not contain lone pairs of electrons, while in NCl_3 molecule it contains a lone pair of electrons.

64) Which molecule has a linear stereo structure and is nonpolar ?

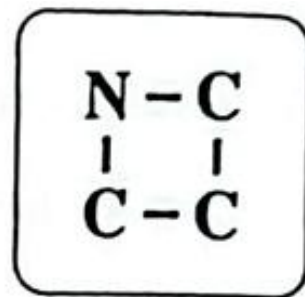
- a- SCN
- b- CS₂
- c- SO₂
- d- H₂O

65) How many hybrid orbitals are found in ethyne molecule?

- a- 4
- b- 3
- c- 2
- d- 1

66) Which of the following represents the number of hydrogen atoms required to fulfill the proper number of bonds in the opposite molecule, and the number of the electron lone pairs in this molecule?

- a- 4 H atoms, 1 lone pair.
- b- 5 H atoms, 2 lone pairs.
- c- 6 H atoms, 2 lone pairs.
- d- 7 H atoms, 1 lone pair.



67) What is the molecule which includes each of the following ?

- 14 electrons.
- 2 lone pairs of electrons.
- 2 pi bonds.

a- C_2H_4

b- HCN

c- H_2O_2

d- N_2

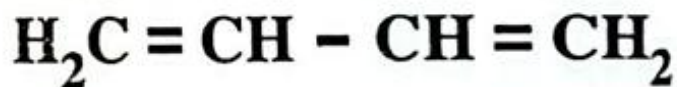
68) Which of the following shows the number of each of sigma bonds and pi bonds in the opposite compound?

a- 2 sigma and 1 pi

b- 7 sigma and 2 pi

c- 2 sigma and 9 pi

d- 9 sigma and 2 pi



69) In the opposite compound:

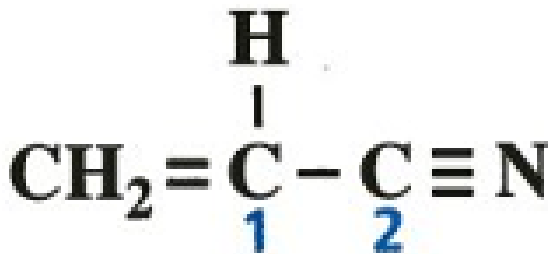
What is the type of hybridization in each of the carbon atoms (1) and (2) respectively ?

a- sp^2, sp

b- sp^3, sp

c- sp, sp^2

d- sp, sp



70) The bond (N - H) in ammonia molecule results from the overlapping of the orbital 1s in hydrogen atom with the hybrid orbital.....

a- sp^2d

b- sp

c- sp^2

d- sp^3

71) In the compound AX_2 the arrangement of the electron pairs in the space is.....

a- linear.

b- tetrahedral.

c- planar triangle.

d- angular.

72) Which of the following abbreviations represents H_2S molecule according to VSEPR theory?

a- AX_2

b- AX_2E_2

c- AX_4

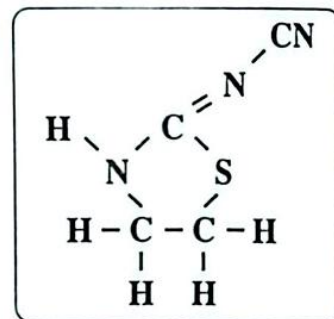
d- AX_3E

73) Which of these two molecules have the same stereo structure ?

- a- $\text{H}_2\text{O}, \text{CO}_2$
- b- $\text{H}_2\text{O}, \text{SCl}_2$
- c- NH_3, BH_3
- d- $\text{SCl}_2, \text{BeCl}_2$

74) Which of the following represents the number of each of σ and pi bonds in the opposite molecule?

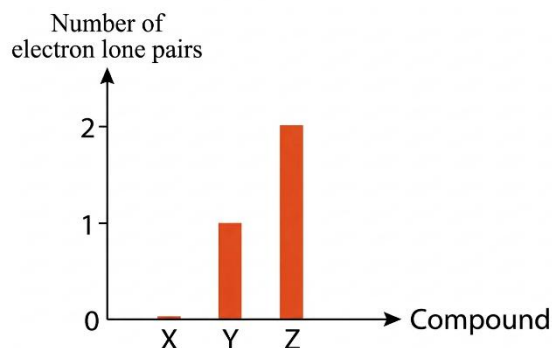
- a- 12 σ and 1 pi
- b- 12 σ and 3 pi
- c- 13 σ and 1 pi
- d- 13 σ and 3 pi



75) The opposite graph shows the number of lone pairs of electrons of three compounds (X, Y and Z).

Which of the following determines these compounds?

- a- X: CH_4 , Y: H_2O , Z: PH_3 ,
- b- X: CH_4 , Y: PH_3 , Z: H_2O
- c- X: H_2O , Y: CH_4 , Z: PH_3 ,
- d- X: H_2O , Y: PH_3 , Z: CH_4



76) Which two compounds of the following both have planar triangle stereo structure ?

a- NH_3 , BF_3

b- SO_2 , H_2O

c- CO_2 , BeF_2

d- SO_3 , BF_3

77) Compare between BF_3 molecule and NH_3 molecule in terms of :

(A) Stereo structure

(B) Arrangement of electron pairs

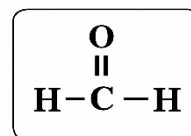
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78) In the molecule illustrated in the opposite figure, carbon forms 3 sigma bonds and 1 pi bond :

(1) Show (by drawing) the distribution of the electrons in an excited carbon atom, and their distribution in the hybrid atom, with mentioning the type of hybridization.



(2) Determine the orbital in carbon atom which is used to form pi bond.

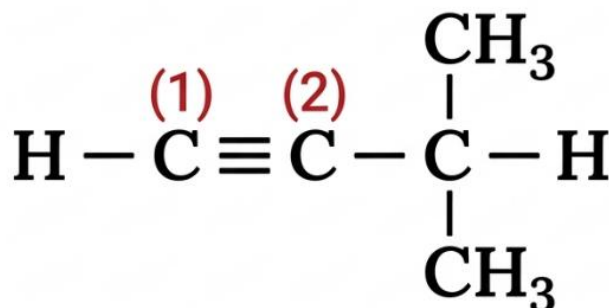
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79) A- What is the number of sigma and pi bonds in this molecule?

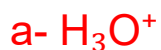
B- What is the type of hybridization in carbon number 1?



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REVISION QUESTIONS ON LESSON 4 CHAPTER 1

80) Each of the following contains bonds coming from one atom, except



81) Which of the following represents both the number of bonds and the angle, respectively, when an ammonia molecule binds to water proton?

a- Increases / Decreases.

b- Increases / Increases.

c- Decreases / Increases.

d- Decreases / Decreases.

82) What is the percentage of the polar covalent bonds (to the total number of bonds) in H_3O^+ ion?

a- 100%

b- 75%

c- 66.7%

d- 25%

83) What is the ratio of the covalent bonds to the coordinate bonds in liquid aluminum chloride molecule?

- a- 3:1
- b- 6:1
- c- 3:2
- d- 2:1

84) Which of the following represents the change in the stereo structure of water molecule after it binds to an acid proton?

- a- Angular $\rightarrow$ Linear.
- b- Linear $\rightarrow$ Angular.
- c- Angular $\rightarrow$ Three-base pyramid.
- d- Three-base pyramid $\rightarrow$ Planar triangle.

85) The bonds which are formed between water molecules and each other are

- a- hydrogen bonds.
- b- ionic bonds.
- c- coordinate bonds.
- d- metallic bonds.

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86) The hydrogen bonds are the strongest between the molecules of

- a- H_2O
- b- HF
- c- HCl
- d- NH_3

87) The strength of the hydrogen bond depends on

- a- the angle between the hydrogen bond and the covalent bond in the same molecule.
- b- the number of the electron bond pairs in the central atom.
- c- the number of the valence electrons of the metal atom.
- d- the atomic masses of the bonded atoms.

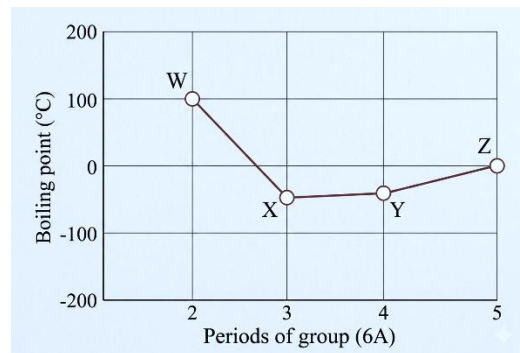
88) The ratio between the polar bond length and the hydrogen bond length in liquid water is equal to

- a- 3
- b- 1.88
- c- 1
- d- 0.53

89) The boiling point of NH_3 is much higher than that of PH_3 , because NH_3

- a- is alkaline.
- b- has three-base pyramid stereostructure.
- c- contains three covalent bonds.
- d- can form hydrogen bonds.

90) The given graph shows the boiling points of the group (6A) elements hydrides. Which of the following can be concluded from the graph?



- a- The molecules of all (6A) group elements hydrides can form hydrogen bonds.
- b- The boiling point of hydrides increases by increasing the period number.
- c- Compound (W) has anomalous boiling point due to the presence of the hydrogen bonds between its molecules.
- d- The strength of the hydrogen bond is equal in the compounds (X) and (Y).

91) What is the correct order of the boiling points of these compounds?

- a- $\text{HF} > \text{NH}_3 > \text{H}_2\text{S}$
- b- $\text{H}_2\text{S} > \text{NH}_3 > \text{HF}$
- c- $\text{HF} > \text{H}_2\text{S} > \text{NH}_3$
- d- $\text{H}_2\text{S} > \text{HF} > \text{NH}_3$

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92) The strength of the metallic bond depends on

- a- the number of valence electrons only.
- b- the number of the completely filled energy levels.
- c- the density of the cation charge only.
- d- the number of valence electrons and the density of the cation charge.

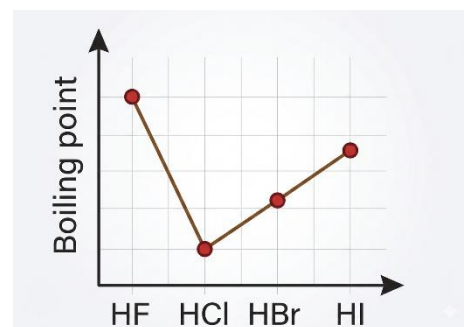
93) Which of the following is true for the melting points of group (1A) elements?

Choices	Melting point	Cause
a	Lithium > Sodium	Density of sodium ion charge is greater
b	Potassium > Sodium	The volume of sodium cation is smaller
c	Potassium > Lithium	Density of potassium ion charge is greater
d	Lithium > Sodium	The volume of lithium cation is smaller

94) Which of the following represents the metals of the third period in the periodic table?

- a- The hardness decreases with increasing the number of valence electrons.
- b- Boiling point increases with increasing the number of valence electrons.
- c- All of them can be scratched by the fingernail.
- d- The hardness decreases with increasing the density of the ion charge.

95) The shown graphical figure clarifies the difference in the boiling points of the hydrogen halides. What is the explanation of the high boiling point of hydrogen fluoride compared to the other hydrogen halides?



96) The opposite diagram shows two types of bonds:

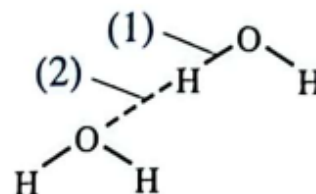
(1) Mention the type of each of the bonds (1) and (2).

(2) Compare between the bonds (1) and (2).

(In terms of: The length – The strength).

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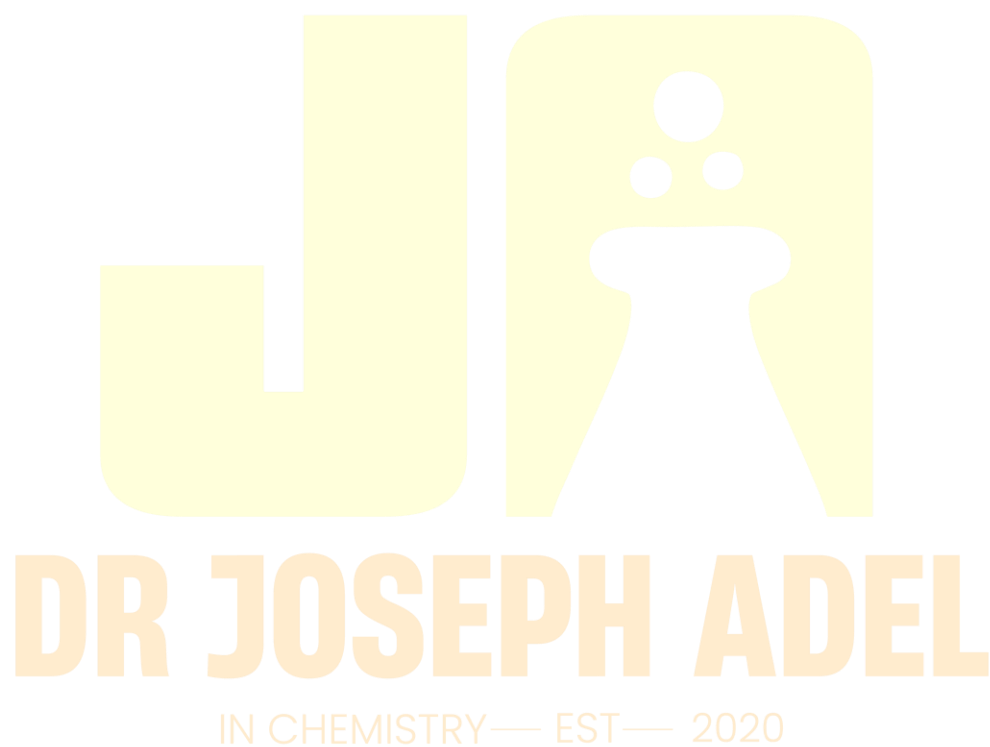


97) Show with a diagram the hydrogen bridge between two molecules of water.

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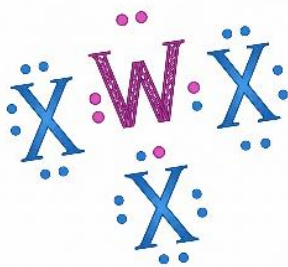
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Model Answer for Lesson 1 Chapter 1 Questions

1	C
2	B
3	B
4	A
5	C
6	B
7	C
8	D
9	B
10	B
11	D
12	C
13	C
14	A
15	A
16	D
17	D
18	C
19	C
20	B

21) (1)



(2) Ionic Bond

22) (1) ${}_6\text{B}$, ${}_{33}\text{C}$

(2) ${}_{37}\text{D}$

23) (1) $\text{MgCl}_2 < \text{CaCl}_2 < \text{NaCl} < \text{KCl}$

(2) $(\text{H}-\text{H}) < (\text{N}-\text{O}) < (\text{H}-\text{Cl}) = (\text{P}-\text{Cl}) < (\text{C}=\text{O})$

(3) $\text{H}_2 < \text{NH}_3 < \text{NF}_3 < \text{H}_2\text{O}$

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Model Answer Lesson 2 Chapter 1 Questions

24	C
25	A
26	D
27	C
28	B
29	B
30	A
31	A
32	C
33	A
34	B
35	D
36	B
37	A
38	A
39	C
40	D
41	D
42	A
43	B

44)

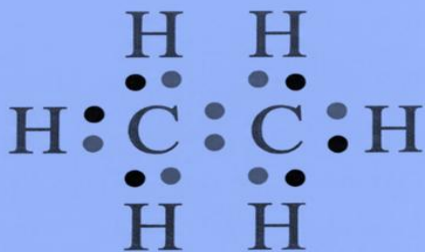
1- Because it cannot explain the bonding in many molecules such as PCl_5 and BF_3 , and it cannot explain many of the properties of the molecules such as the stereo structure of the molecule, and the angles between the bonds.

2- This rule does not apply to molecules in which the total number of valence electrons of the atoms is odd

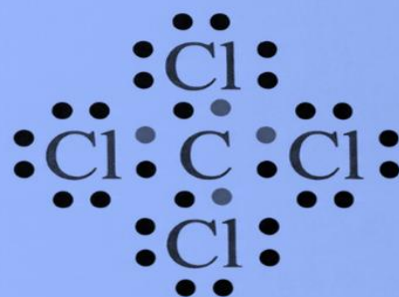
45) Because the boron atom in BF_3 molecule is surrounded by 6 electrons only.

46)

(1)



(2)



Model Answer Lesson 3 Chapter 1 Questions

47	B
48	C
49	C
50	C
51	C
52	D
53	C
54	C
55	B
56	D
57	A
58	A
59	D
60	A
61	A
62	D
63	D
64	B
65	A

66	D
67	D
68	D
69	A
70	D
71	A
72	B
73	B
74	D
75	B
76	D

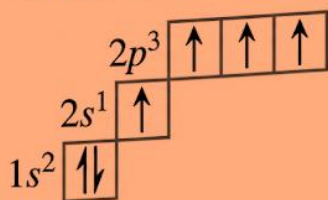
77)

a) planar triangle, three base pyramid

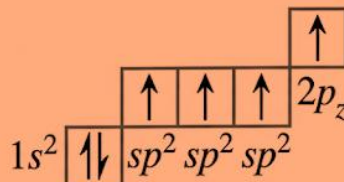
b) planar triangle ,tetrahedron

78)

(1) • Excited carbon atom :



• Hybridized carbon atom :



• Type of hybridization : sp^2

(2) $2p_z$

79)

A) 12 sigma, 2pi

B) sp hybridization

DR JOSEPH ADEL

IN CHEMISTRY — EST — 2020

Model Answer Lesson 4 Chapter 1 Questions

80	D
81	B
82	C
83	A
84	C
85	A
86	B
87	A
88	D
89	D
90	C
91	A
92	D
93	D
94	B

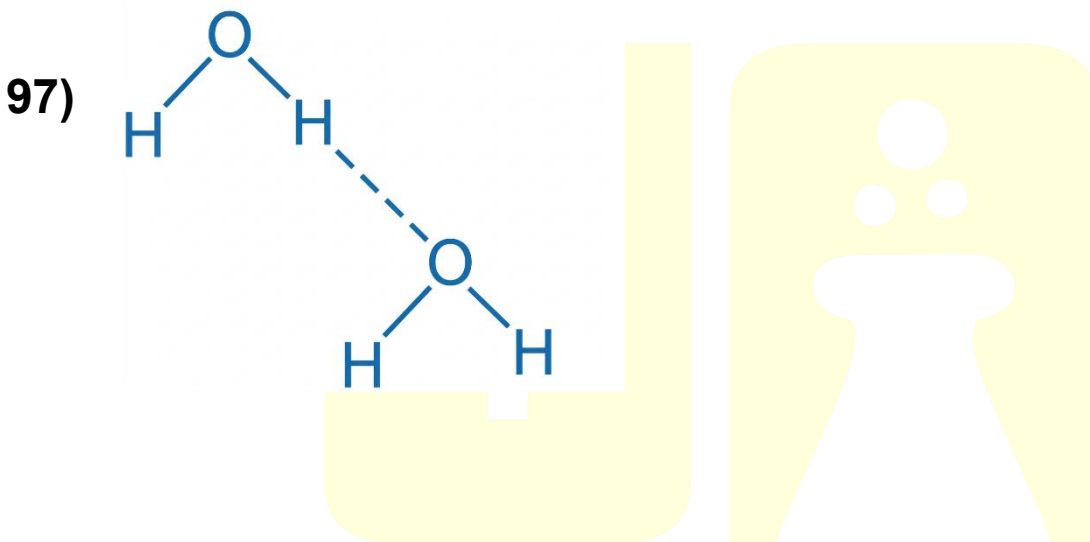
95) Because HF molecules are bonded with hydrogen bonds which require a large amount of thermal energy to be broken, unlike the other hydrogen halides.

96) (1): Polar covalent bond.

(2): Hydrogen bond.

(2)

	Bond (1)	Bond (2)
Length	Shorter than (2)	Longer than (1)
Strength	Shorter than (2)	Weaker than (1)



تم القضاء على مراجعة شابت 1 على خير و سلام

شرح و حل تفصیلی یا لوکس

Chapter 2 نتقابل بقى على

المدمر الثقيل محتاج شغل ثانوية عامة يا باااشااااااا

خلص الكلام مسك الختام يلا سلااااام

Dr. Joseph Adel

Chemistry Teacher

حمل الآن

مجاناً وحصرياً

المراجعة رقم (4)

اختبار شهر مارس



Home performance (Week 1)

Q1/ choose the correct answer:-

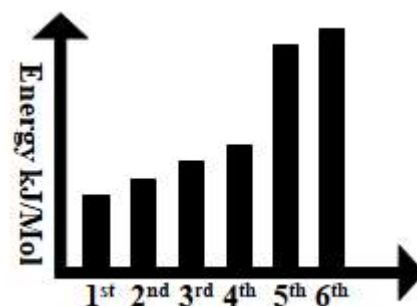
1- Which of the following represents the combination of two atoms of an element whose atomic number (8)?

- (a) Each atom share by one electron
- (b) Each atom share by two electrons
- (C) Ionic bond is formed
- (d) Physical bond is formed

2- Noble gases molecules consist of

- (a) One atom
- (b) Two atoms
- (C) Three atoms
- (d) Four atoms

3-The opposite graphical figure shows the successive Ionization potentials of an element (X), so the Lewis Dot – representation symbol of the element (Y) that Proceeds (X) in the same group are



- (a)  (b)  (c)  (d) 

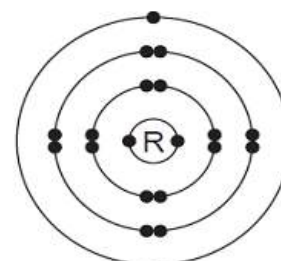
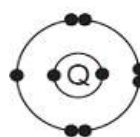
4-Which of the following molecules contains the largest number of lone pairs of electrons?

- (a) MgO
- (b) NaCl
- (c) MgCl₂
- (d) Na₂O

5- The electronic structures of atoms Q and R are shown.

Q and R form an ionic compound, what is the formula of the compound?

- (a) QR₇
- (b) Q₂R₄
- (C) QR
- (d) Q₇R



6- A nonmetal (X) reacts with a metal (M) to give the formula M_2X . Which pairing below is most like elements represented by M and X?

- (a) $_{20}\text{Ca}$ and $_{7}\text{N}$
- (b) $_{7}\text{Li}$ and $_{16}\text{S}$
- (c) $_{14}\text{Si}$ and $_{8}\text{O}$
- (d) $_{37}\text{Rb}$ and $_{9}\text{F}$

7-Which of the following does not conduct electricity?

- (a) $\text{NaCl}_{(\text{aq})}$
- (b) $\text{KCl}_{(\text{l})}$
- (c) $\text{MgCl}_{2(\text{s})}$
- (d) $\text{LiF}_{(\text{aq})}$

8- Which of the following choices represents groups whose elements together form a strong ionic bond?

- (A) 1A&2A
- (B) 6A&7A
- (C) 2A&4A
- (D) 1A & 7A

9- Which of the following equations expresses an instantaneous reaction?

- (a) $\text{NaCl}_{(\text{aq})} + \text{AgNO}_{3(\text{aq})} \rightarrow \text{NaNO}_{3(\text{aq})} + \text{AgCl}_{(\text{s})}$
- (b) $\text{Zn}_{(\text{s})} + \text{H}_2\text{SO}_{4(\text{aq})} \rightarrow \text{ZnSO}_{4(\text{aq})} + \text{H}_{2(\text{g})}$
- (c) $\text{N}_{2(\text{g})} + 3\text{H}_{2(\text{g})} \rightarrow 2\text{NH}_{3(\text{g})}$
- (d) $\text{Fe}_{(\text{s})} + 2\text{HCl}_{(\text{aq})} \rightarrow \text{FeCl}_{2(\text{aq})} + \text{H}_{2(\text{g})}$

10-Metals tend to reach the electronic configuration of

- (a) The inert gas that follows it in the periodic table
- (b) The inert gas that precedes it in the periodic table
- (c) The metal that is less chemically active than it
- (d) The non-metal that is more chemically active than it



Weekly assessment (Week-1)

The element	Na	Al	Cl	Mg	K	F	O	P	H	S	N
Electronegativity	0.9	1.5	3	1.2	0.8	4	3.5	2.1	2.1	2.5	3
Atomic number	11	13	17	12	19	9	8	15	1	16	7

A

Q1/ State the scientific reason:

- 1- Molten and solutions of ionic compounds conduct electricity.
- 2- Metals and non-metals are chemically active, while noble gases are chemically inert.

Q2/ using the following table, write the chemical formula for an ionic compound:

element	Al	Cl	Mg
Electronegativity	1.5	3	1.2

Q3/ Choose the correct answer:

1- Which of the following compounds has the lowest ionic character?

- (A) Sodium chloride
- (B) Magnesium chloride
- (C) Potassium chloride
- (D) Aluminum chloride

2- Which of the following choices represents a physical bond?

- (A) Ionic bond
- (B) Covalent bond
- (C) Metallic bond
- (D) Coordination bond



B

Q1/ State the scientific reason:

- 1- Ionic compounds do not conduct electricity in their solid state.
- 2- Electronegativity plays an important role in determining the type of bond.

Q2/ using the following table, write the chemical formula for covalent compound:

element	Al	Cl	Mg
Electronegativity	1.5	3	1.2

Q3/ Choose the correct answer:

1- Which of the following compounds has the highest ionic character?

- | | |
|------------------------|------------------------|
| (A) Sodium chloride | (B) Magnesium chloride |
| (C) Potassium chloride | (D) Aluminum chloride |

2- Which of the following choices represents a chemical bond?

- | | |
|-------------------------|--------------------|
| (a) Van der Waals bonds | (b) Hydrogen bonds |
| (c) Metallic bonds | (d) Covalent bonds |

C

Q1/ State the scientific reason:

- 1- The ionic character in the compound KCl is higher than in the compound LiCl.
- 2- Ionic compounds are characterized by high melting and boiling points.

Q2/ using the following table, write the chemical formula for the compound has a higher ionic property:

element	H	Cl	Na
Electronegativity	2.1	3	0.9

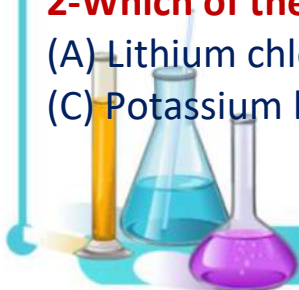
Q3/ Choose the correct answer:

1-Which of the following choices does not represent a chemical bond?

- | | |
|-------------------|-----------------------|
| (A) Ionic bond | (B) Covalent bond |
| (C) Hydrogen bond | (D) Coordination bond |

2-Which of the following compounds does not represent an ionic compound?

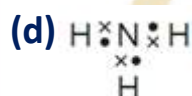
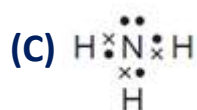
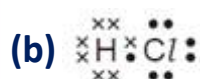
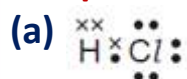
- | | |
|-----------------------|------------------------|
| (A) Lithium chloride | (B) Magnesium chloride |
| (C) Potassium hydride | (D) Aluminum chloride |



Home performance (Week 2)

Q1/ choose the correct answer:-

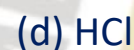
1-Which electron arrangement for the outer shell electrons in a covalent compound is correct?



2- Which of the following molecules has a central atom that does not reach The electronic configuration of a noble gas and is surrounded by the largest number of bond pairs?



3- Which of the following choices represents a nonpolar molecule with the largest number of lone pairs?

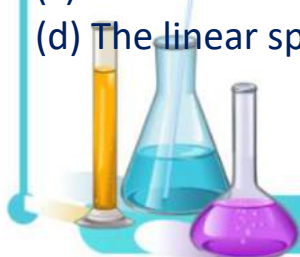


4-Which of the following statement about a molecule NH_3 , is correct?

- (a) Each hydrogen atom donates a pair of electrons to a nitrogen atom
- (b) There are double covalent bonds between the nitrogen atom and the hydrogen Atom
- (c) There are single covalent bonds between its hydrogen atoms
- (d) There are three shared pairs of electrons in the molecule

5- Which of the following choices explains the polarity of hydrogen chloride molecules?

- (a) Complete transfer of electrons to the chlorine atom.
- (b) Displacement of the electron cloud toward the more electronegative atom Without complete transfer.
- (c) The difference in electronegativity between hydrogen and chlorine is 0.4.
- (d) The linear spatial shape of the molecule.



6- Which of the following molecules has the highest solubility in polar solvents such as water?

- (a) CH_4
- (b) Cl_2
- (c) CO_2
- (d) NH_3

7- Which Lewis dot structure represents bonding in potassium iodide?

- (a) $\text{K}^+ [\text{:}\ddot{\text{I}}\text{:}]^-$
- (b) $[\text{:}\ddot{\text{K}}\text{:}]^- \text{I}^+$
- (c) $\text{K} \text{:}\ddot{\text{I}}\text{:}$
- (d) $\text{:}\ddot{\text{K}}\text{:I}$

8- The idea behind “covalent drugs” in treating viruses is based on:

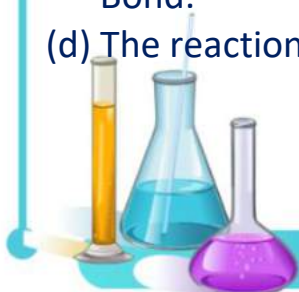
- (a) Forming temporary ionic bonds with the virus protein.
- (b) Covalent bonding with the virus protein to inhibit its action.
- (c) Increasing the molecular mass of the virus to make it easier to detect.
- (d) Breaking covalent bonds within the infected cell.

9-The device used to estimate the molecular mass of a covalent drug before and after it binds to the virus protein is:

- (a) An electron microscope.
- (b) A mass spectrometer.
- (c) An atomic absorption spectrometer.
- (d) A sensitive balance.

10- Which of the following reactions is expected to be the “fastest” under standard conditions?

- (a) The reaction of hydrogen gas molecules with chlorine gas molecules to form a Polar HCl molecule.
- (b) The reaction of sodium chloride (NaCl) solution with silver nitrate solution to form A precipitate.
- (c) The reaction of a covalent drug with a viral protein to form a permanent covalent Bond.
- (d) The reaction of methane gas (CH_4) with oxygen (combustion).



Weekly assessment (Week-2)

A

Q1/ State the scientific reason:

- 1- Most of covalent compound compounds do not conduct electricity.
- 2- Carbon dioxide molecule is nonpolar.

Q2/ Using the following elements $_{15}\text{A}$, $_{11}\text{B}$, $_9\text{C}$, $_6\text{D}$

- Which of them can form with hydrogen?

- (1) Ionic compound
- (2) Polar covalent compound

Q3/ The diagrams below represent Lewis electron dot- symbols of three different elements:-



-Write the chemical formulas for the possible ionic compounds.

.....

B

Q1/ State the scientific reason:

- 1- Most covalent compounds are characterized by low boiling and melting points.
- 2- Boron trifluoride molecule is nonpolar.

Q2/ Using the following elements $_{15}\text{A}$, $_{11}\text{B}$, $_9\text{C}$, $_6\text{D}$

- Which of them can form with hydrogen?

- (1) Non-polar covalent compound
- (2) Covalent compound whose molecule contains three bond pairs and one lone pair

Q3/ The diagrams below represent Lewis electron dot- symbols of three different elements:-



-Write the chemical formula for a molecule contains 10 lone pairs of electrons
And 3 bond pairs

.....

.....



2- Ammonia gas dissolves in water to a greater extent than carbon dioxide gas.

- Which of them can form with hydrogen?

- (1) Covalent compound whose molecule contains three lone pairs and one bond pair
- (2) Covalent compound whose molecule contains four bond pairs.....



-Write the chemical formula for a molecule contains 10 lone pairs of electrons and 3 bond pairs



Home performance (Week 3)

Q1/ choose the correct answer:-

(1) Which of the following molecules doesn't obey the octet rule?

- a) CH_4
- b) NH_3
- c) NO_2
- d) H_2O

2-Using the following table:

Group number	The element
15	X
13	Y
16	Z

-Which of the following compounds has central atom that follow the octet Rule?

- (a) XCl_3 and YCl_3
- (b) YCl_3 and ZCl_2
- (c) XCl_3 and ZCl_2
- (d) YCl_3 only

3 - Given that the molecular formulas of the chlorides of elements (A) and (B) are (ACl_3) and (BCl_2) respectively, and both obey the octet rule;

-which of the following choices represents the valence shell electron Configuration for elements (A) and (B)

- (a) A: ns^2, np^1 , B: ns^2, np^4
- (b) A: ns^2, np^3 , B: ns^2, np^4
- (c) A: ns^2, np^3 , B: ns^2, np^2
- (d) A: ns^2, np^5 , B: ns^2, np^4



4- Which of the following choices represents Hydrazine molecule ($\text{H}_2\text{N}-\text{O}-\text{H}$)? ($1\text{H}, 7\text{N}, 8\text{O}$)

	Number of lone pairs	Number of bond pairs
a	4	3
b	3	4
c	3	2
d	2	3

5- The hydrogen molecule reaches a state of stability when the two hydrogen Atoms approach each other to a distance at which:

- The electron density is as high as possible and the energy of the molecule is Greater than the sum of the energies of its atoms.
- The electron density is as low as possible and the energy of the molecule is less Than the sum of the energies of its atoms.
- The electron density is as high as possible and the energy of the molecule is less Than the sum of the energies of its atoms.
- The electron density is as low as possible and the energy of the molecule is Greater than the sum of the energies of its atoms.

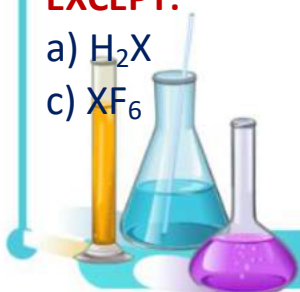
6- According to the Valance bond theory, the covalent bond in (HF) molecule is Formed as a result of:

- The overlap of the (1s) orbital of the hydrogen atom with the ($2p_z$) orbital of the Fluorine atom
- The overlap of the (1s) orbital of the hydrogen atom with the ($2p_y$) orbital of The fluorine atom
- The fluorine atom reaching a stable state by surrounding itself with eight Electrons through sharing.
- The overlap of the (1s) orbital of the hydrogen atom and the orbital ($2p_x$) of the Fluorine atom element (X) has 6 valence electrons.

7- Element (X) has 6 valence electrons.

all of the following compounds of element (X) obey the Electronic Theory of Valency EXCEPT:"

- H_2X
- XF_2
- XF_6
- XCl_2



8- According to the Valence bond theory, the covalent bond in ammonia (NH_3) is Formed as a result of:

- The overlap of the (1s) orbital of the hydrogen atom with the single electron Orbital of the nitrogen atom
- Contact between the energy level (K) of the hydrogen atom and the energy Level (L) of the nitrogen atom
- The nitrogen atom reaching a stable state by surrounding itself with eight Electrons through sharing.
- Overlap of the (1s) orbital of the hydrogen atom with the (2s) orbital of the Nitrogen atom

9- Which of the following molecules did the simple concept of covalent bonding fail to explain?

- H_2
- BeF_2
- HF
- Cl_2

10- Which of the following choices represents Hydrazine molecule ($\text{H}_2\text{N}-\text{NH}_2$)? ($1\text{H}, 7\text{N}, 8\text{O}$)

	Number of lone pairs	Number of bond pairs
a	4	3
b	3	4
c	2	6
d	2	5

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A

Weekly assessment (Week-3)

Q1/ State the scientific reason:

- Valence Bond Theory (based solely on the concept of atomic orbital overlap) was unable to explain the structure of the 'Boron Trifluoride' molecule

Q2/ Using the following table:

Atomic number	Element
1	X
13	Y
16	Z
17	W

1- Write the chemical formula of the compound formed by the combination of Element (Y) and element (W). Does it obey the Octet Rule? Explain why.

2- According to the Valence Bond Theory (VBT), identify the atomic orbitals Involved in forming the bond in the molecule (XW).

Q3/ Choose the correct answer: -

1- Which of the following is true for boron trifluoride: -

- a) Obeys to the octet rule.
- b) Its bonds can be explained by the concept of orbital overlap.
- c) Obeys to the octet rule, and its bonds can be explained by V.B.T in its simplest form.
- d) does not obey to octet rule, and its bonds cannot be explained by V.B.T in its simplest form.

2- Which of the following options describes the phosphine molecule PH_3 ?

- a) Does not obey to octet rule, and the bond is formed by the overlap of the (s) orbital of the (H) atom with the single electron orbital of the (P) atom.
- b) Obeys to the octet rule, and the bond is formed by the overlap of the (s) orbital of the (H) atom with the orbital containing a single electron from the (P) atom.
- c) Obeys to the octet rule, and the bond is formed by the overlap of the (s) orbital of the (H) atom with the (s) orbital of the (P) atom.
- d) Does not obey to octet rule, and the bond is formed by the overlap of the (s) orbital of the (H) atom with the (s) orbital of the (P) atom, which has a single electron.



B

Q1/ State the scientific reason:

- The octet theory does not apply to the NO_2 molecule.

Q2/ Using the following table:

Atomic number	Element
1	X
13	Y
16	Z
17	W

1- Write the chemical formula for the element (W). Does the octet rule apply to it, and why?

2- According to the valence bond theory, identify the atomic orbitals that form the bond in the molecule (X_2)

Q3/ Choose the correct answer: -

1- Which of the following options describes the beryllium chloride molecule BeCl_2 : -

- a) Does not obey to octet rule, and its bonds cannot be explained by the simple Concept of orbital overlap.
- b) Does not obey to octet rule, and its bonds can be explained by the simple Concept of orbital overlap.
- c) Obeys to the octet rule and its bonds can be explained by the simple Concept of orbital overlap.
- d) Obeys to the octet rule, and its bonds cannot be explained by the simple Concept of orbital overlap.

2- Which of the following statements correctly describes the phosphorus chloride Molecule PCl_3

- a) Does not obey to octet rule, and the bond is formed by the overlap of the (p_x) Orbital of the (Cl) atom with the orbital containing a single electron of the (P) atom.
- b) Does not obey to octet rule, and the bond is formed by the overlap of the (p_z) Orbital of the (Cl) atom with the orbital containing a lone electron of the (P) atom
- c) Obeys to the octet rule and the bond is formed by the overlap of the (p_z) orbital of The (Cl) atom with the orbital containing a single electron from the (P) atom
- d) Obeys to the octet rule, and the bond is formed by the overlap of the (p_x) orbital of The Cl atom with the orbital containing a single electron of the (P) atom.



Q1/ State the scientific reason:

- 1- Failure of the concept of simple atomic orbital overlap to explain the bonds in the BeF_2 molecule

Q2/ Using the following table:

Atomic number	Element
1	X
13	Y
6	Z
17	W

- 1- Write the chemical formula for a compound consisting of elements (Z) and (X) That obeys to octet rule.

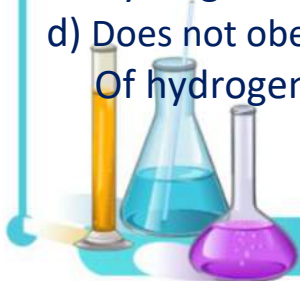
- 2- According to the valence bond theory, identify the atomic orbitals that form The bond in the molecule (XW).

Q3/ Choose the correct answer: -
1- Which of the following describes (PCl_5) molecule?

- Obeys to octet rule, and its bonds cannot be explained by the simple concept of V.B.T
- Its bonds can be explained by simple concept of V.B.T
- Obeys to octet rule and its bonds can be explained by simple concept of V.B.T
- Does not obey to octet rule, and its bonds cannot be explained by simple concept of V.B.T

2- Which of the following statements correctly describes the hydrogen fluoride Molecule HF?

- The octet theory does not apply to it, and its bonds arise from the overlap of the (s) Orbital of hydrogen with the (s) orbital of the fluorine atom.
- Obeys to octet rule, and its bonds arise from the overlap of the (1s) orbital of Hydrogen with the ($2p_z$) orbital of the fluorine atom.
- Obeys to octet rule and its bonds arise from the overlap of the (1s) orbital of Hydrogen with the (2s) orbital of the fluorine atom.
- Does not obey to octet rule, and its bonds arise from the overlap of the (1s) orbital Of hydrogen with the ($2p_z$) orbital of the fluorine atom.



Home performance (Week 4)

Q1/ choose the correct answer:-

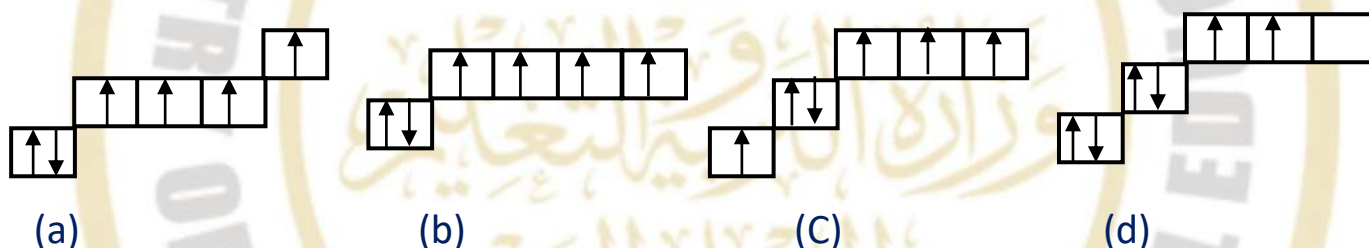
1- The hybrid orbital is.....

- (a) More active and less protruded
- (b) More protruded and less capable to overlapping
- (c) More protruded and more capable to overlapping
- (d) Less active than a pure orbital

2-All of the following are conditions for hybridization except:

- (a) It occurs between orbitals of the same atom
- (b) It occurs between orbitals that are close in energy
- (c) The electrons of the atom must be excited
- (d) The number of orbitals entering = the number of orbitals resulting.

3- Which of the following represents a hybrid carbon atom in methane?



4- Which of the following choices expresses the orbitals involved in the formation of sigma (σ) bonds in hydrogen cyanide ($\text{H}-\text{C}\equiv\text{N}$)?

	Sigma bond between (C) and (H)	Sigma bond between (C) and (N)
a	(p_y) of a carbon atom with (s) of a hydrogen atom	(p_y) of a carbon atom with (sp) of a nitrogen atom
b	(sp^2) of a carbon atom with (s) of a hydrogen atom	(sp) of a carbon atom with (sp^3) of a nitrogen atom
c	(sp) of a carbon atom with (s) of a hydrogen atom	(sp) of a carbon atom with (sp) of a nitrogen atom
d	(p_z) from a carbon atom with (s) from a hydrogen atom	(sp^2) from a carbon atom with (sp^2) from a nitrogen atom

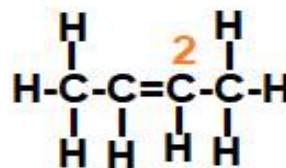


5- According to the V.B.T, which of the following expresses the readiness of an oxygen atom to form covalent bonds in a water molecule?

- A) Excitation of one of the electrons in the (2s) subshell, followed by (sp²) Hybridization.
- b) No excitation of the subshell electron (2s) and hybridization of type (sp³)
- c) Excitation of one of the subshell electrons (2s) followed by hybridization of type (sp²)
- d) No excitation of the subshell electron (2s) and hybridization of type (sp²)

6-Which of the following represents the electronic distribution of carbon atom Number (2) in the corresponding molecule?

- (a) 1s², (sp²)¹, (sp²)¹, (sp²)¹, 2p_z¹
- (b) 1s², (sp³)¹, (sp³)¹, (sp³)¹, (sp³)¹
- (C) 1s², (sp)¹, (sp)¹, 2p_y¹, 2p_z¹
- (d) 1s², 2s², 2p²

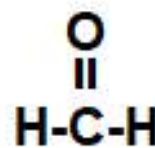


7-The sigma bond between the two carbon atoms in the ethylene molecule C₂H₄ is formed as a result of the overlap between the orbitals:

- (a) 1s¹ & SP³
- (b) SP² & SP²
- (c) 1s¹ & 1s¹
- (d) 1s¹ & 2p_z¹

8- Which of the following describes the orbitals involved in the formation of the sigma (σ) bond between the carbon atom and the oxygen atom in formaldehyde molecule shown in the figure?

- A) The sp² orbital of the carbon atom with the sp orbital of the Oxygen atom
- B) The sp² orbital of the carbon atom with the sp² orbital of the Oxygen atom.
- C) The overlap of the sp orbital of the carbon atom with the sp orbital of the Oxygen atom.
- D) The overlap of the sp² orbital of the carbon atom with the 2S orbital of the Oxygen atom.

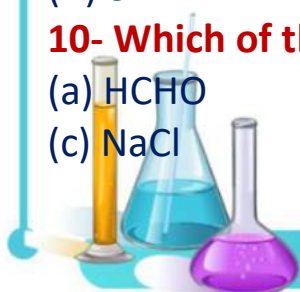


9- Which of the following choices expresses the number of pure orbitals involved in hybridization to produce SP³d hybrid orbitals?

- (A) 3
- (B) 4
- (c) 5
- (d) 6

10- Which of the following compounds contains two types of bonds?

- (a) HCHO
- (b) Ba(CN)₂
- (c) NaCl
- (d) PCl₃



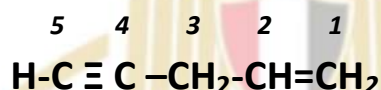
Weekly assessment (Week-4)

A

Q1/ State the scientific reason:

- Although a carbon atom has two unpaired electrons in its ground state, it forms four covalent bonds in a methane molecule.

Q2/ Study the following compound well and then answer the following questions:



1-Identify the type of orbitals involved in the formation of the bond Between carbon atom (1) and hydrogen atom

2- What is the number of pi bonds and the number of electron densities around carbon Atom number (5)?

Q3/ Choose the correct answer: -

- 1- Element (X) is located in group (15) of the periodic table. When forming the molecule XH_3
- Which of the following expresses the type of hybridization in the central atom according to the valence bond theory?

- A) sp^3
- B) sp^2
- c) No hybridization occurs
- d) sp

2- The central atom in all of the following compounds undergo SP^2 hybridization except:

- A) C_2H_4
- B) $\text{CH}_2=\text{CHCl}$
- C) HCHO
- D) H_2O

3- Which pairs of the following compounds agree in the type of hybridization?

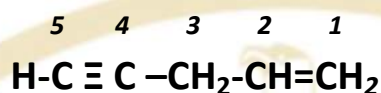
- A) C_2H_4 - CO_2
- B) NH_3 - BF_3
- C) CH_4 - H_2O
- D) BeCl_2 - H_2O



Q1/ State the scientific reason:

- No excitation occurs in the oxygen atom when water molecules are formed.

Q2/ Study the following compound well and then answer the following questions:



1-Identify the type of orbitals involved in the formation of the bond Between carbon atoms (3) and (4)

2- How many sigma bonds are there between carbon atoms and hydrogen atoms in the Molecule?

Q3/ Choose the correct answer: -

1- Which of the following expresses the orbitals involved in the formation of bonds Between carbon atoms in the ethylene molecule?

- a) sp -sp is a sigma bond , p_y-p_y is a pi bond
- C) sp^2-sp^2 is a sigma bond , p_y-p_y is a pi bond
- d) sp -sp is a sigma bond , p_z-p_z is a pi bond
- c) sp^2-sp^2 is a sigma bond , p_z-p_z is a pi bond

2- All of the following compounds undergo (sp) hybridization except:

- a) C_2H_6
- b) $\text{CH} \equiv \text{CCl}$
- C) CO_2
- d) C_2H_2

3- Which pairs of the following compounds do not agree in the type of hybridization of the central atom?

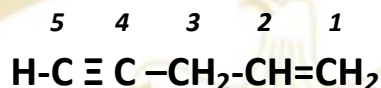
- a) CH_4 - C_2H_6
- b) H_2O - NH_3
- C) BeCl_2 - H_2O
- d) CH_4 - NH_3



Q1/ State the scientific reason:

- No excitation occurs in the nitrogen atom when ammonia gas is formed

Q2/ Study the following compound well and then answer the following questions:



1-Identify the type of orbitals involved in the formation of the bond
Between carbon atoms (2) and (3)

2- How many sigma bonds are there between carbon atoms in the molecule?

Q3/ Choose the correct answer: -

1- Element (X) is located in group (16) of the periodic table. When forming the H_2X molecule

- Which of the following expresses the type of hybridization in the central Atom according to the valence bond theory?

- a) sp^3
- b) sp^2
- c) No hybridization occurs
- d) sp

2- All of the following compounds undergo SP^3 hybridization except:

- a) CH_4
- b) $\text{H}-\text{C}\equiv\text{N}$
- c) NH_3
- d) H_2O

3- Which pairs of compounds agree in the type of hybridization of the central Atom?

- a) $\text{C}_2\text{H}_2 - \text{BeCl}_2$
- b) $\text{NH}_3 - \text{BF}_3$
- c) $\text{C}_2\text{H}_4 - \text{H}_2\text{O}$
- d) $\text{BeCl}_2 - \text{H}_2\text{O}$



Home performance (Week 5)

Q1/ choose the correct answer:-

1- Which of the following expresses a central atom that cannot form a Coordinate bond?

- (a) AX_2E_2
- (b) AX_3
- (c) AX_2E
- (d) AX_3E

2- Which of the following expresses the coordinate bond in a fluoroborate ion (BF_4^-)?

	Donor atom or ion	Acceptor atom or ion
A	Boron atom donates ($2e^-$) from orbital (sp^2)	Fluoride ion accept ($2e^-$) in orbital ($3s$)
B	Fluoride ion donates ($2e^-$) from sublevel ($2p$)	Boron atom accept ($2e^-$) in orbital ($2P_z$)
C	Boron atom donates ($2e^-$) from orbital ($2s$)	Fluoride ion accept ($2e^-$) in orbital ($2s$)
d	Fluoride ion donates ($2e^-$) from level ($2s$)	Boron atom accept ($2e^-$) in orbital (sp^2)

3-Which of the following bonds do chemists consider being the “bond of life” and the Reason for the continuation of life on Earth?

- (a) Metallic bond
- (b) Covalent bond
- (c) Ionic bond
- (d) Hydrogen bond

4. The following table shows the boiling points of hydrogen halides:

Hydrogen halide	Boiling point
HF	19
HCl	-85
HBr	-67
HI	-35

-Which of the following choices explains why hydrogen fluoride has a high Boiling point?

- (a) HF molecules have a smaller dipole moment.
- (b) HF is a stronger acid.
- (c) HF is less soluble in water.
- (d) HF molecules are bound by hydrogen bonds.



5-Which of the following expresses the type and number of bonds in a Molecule of liquid aluminum chloride Al_2Cl_6 ?

- (a) Six covalent bonds and two coordinate bonds
- (b) Six coordinate bonds and two covalent bonds
- (c) Three covalent bonds and one coordinate bond
- (d) Six covalent bonds and one coordinate bond

6. The atom of element (X) has only four completely filled subshells, so a sample of this element has bonds that are...

- (a) Pure covalent
- (b) Ionic
- (c) Metallic
- (d) Polar covalent

7- Three organic compounds (X, Y, Z) have the following chemical formulas:

X: $\text{CH}_3\text{-CH}_2\text{-CH}_2\text{-CH}_2\text{-CH}_3$

Y: $\text{CH}_3\text{-CH}_2\text{-CH}_2\text{-CH}_2\text{-OH}$

Z: $\text{HO-CH}_2\text{-CH}_2\text{-CH}_2\text{-OH}$

- Based on your study of polarity and hydrogen bonding.

- Which of the following choices expresses the correct order of these compounds According to their degree of solubility in water?

- (A) $Z < Y < X$
- (B) $Y < Z < X$
- (C) $X < Y < Z$
- (d) $X < Z < Y$

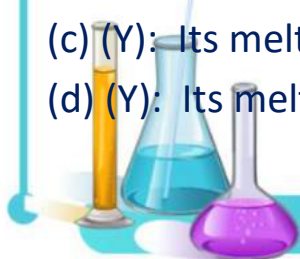
8- Elements (X, Y) are from the third period:

(X): The number of valence electrons is half the number of electrons in the first energy level.

(Y): Its electron distribution ends with $3p^1$

- Which of the following is correct?

- (A) (Y): Its melting point is higher and its crystal is softer than (X)
- (B) (Y): Its melting point is lower and its crystal is harder than (X)
- (c) (Y): Its melting point is lower and its crystals are softer than (X).
- (d) (Y): Its melting point is higher and its crystals are harder than (X).



9- Which of the following expresses the relationship between bonds in a sample Of hydrogen fluoride (HF)?

- (a) The bond between (H, F) atoms in the molecule is “shorter and stronger” Than the bond between its molecules.
- (b) The bond between (H, F) atoms in the molecule is “longer and weaker” than The bond between its molecules.
- (c) The bond between (H, F) atoms in the molecule is “shorter and weaker” than The bond between its molecules.
- (d) The bond between (H, F) atoms in the molecule is “longer and stronger” than The bond between its molecules.

10- The following table shows the degree of hardness values of three metallic elements (X, Y, and Z) located in the third period of the periodic table according to the Mohs scale:

degree of hardness Mohs scale	Metallic element
2.75	(X)
0.5	(Y)
2.5	(Z)

-Which of the following choices correctly represents the groups to which these elements belong?

	(X)	Y	Z
A	Group (3A)	Group (2A)	Group (2A)
B	Group (1A)	Group (1A)	Group (3A)
C	Group (2A)	Group (3A)	Group (1A)
d	Group (3A)	Group (2A)	Group (1A)



Weekly assessment (Week-5)

A

Q1/ Compare (CH_4 - BeF_2) in terms of:

(The spatial shape of the molecule, the number of free electron pairs and bonding electron pairs – the abbreviated formula)

Q2/ State the scientific reason:

- Dry hydrogen chloride gas does not affect on dry litmus paper, but it turns litmus paper wet with water to red

Q3/ Choose the correct answer: -

1-When ammonia molecules combine with hydrogen protons H^+ to form hydronium ions NH_4^+

-Which of the following changes occur in the spatial shape and angle value between the bonds?

- (a) The shape changes from (angular) to (Triagonal triangle) and the angle value Decreases.
- (b) The shape changes from (linear) to (angular) and the angle increases.
- (c) The shape changes from (angular) to (Tribase pyramid) and the angle increases.
- (d) The shape changes from (Tribase pyramid) to (tetrahedral) and the angle decreases.

2- Which of the following expresses the type and number of bonds in the ammonium hydroxide molecule NH_4OH ?

- (a) 1 ionic bond, 1 coordinate bond, 3 polar covalent bonds.
- (b) 1 ionic bond, 1 coordinate bond, 4 polar covalent bonds.
- (c) 2 ionic bonds, 2 coordinate bonds, 3 polar covalent bonds.
- (d) 1 ionic bond, 4 coordinate bonds, 1 nonpolar covalent bond.

3- Which of the following compounds can form hydrogen bonds between their molecules?

- (a) PH_3
- (b) AsH_3
- (c) NH_3
- (d) CH_4



Q1/ Compare ($\text{SO}_2 - \text{BF}_3$) in terms of:

(The spatial shape of the molecule, the number of free electron pairs and bonding electron pairs – the abbreviated formula)

Q2/ State the scientific reason:

- Hydrogen chloride gas dissolved in benzene does not conduct electricity, whereas its solution in water conduct electricity.

Q3/ Choose the correct answer: -

1-When a third phosphorus fluoride molecule PF_3 combines with a fluorine atom (or proton) to form a phosphorus tetrafluoride ion PF_4^+ , which of the following Changes occur in the spatial configuration and angle value of the central atom?

- (a) The shape changes from a (Triagonal planar) to (Tribase pyramid), and the angle Value decreases.
- (b) The shape changes from an (Angular) to a (Tribase pyramid), and the angle value Increases.
- (c) The shape changes from a (Tribase pyramid) to a (tetrahedron) and the angle Value increases.
- (d) The shape changes from a (Tribase pyramid) to an (angular) shape and the Angle value remains constant.

2- Which of the following expresses the type and number of bonds in the ammonium chloride molecule NH_4Cl ?

- (a) 1 ionic bond, 2 coordinate bonds, 2 polar covalent bonds.
- (b) 2 ionic bonds, 1 coordinate bond, 2 polar covalent bonds.
- (c) 1 ionic bond, 1 coordinate bond, 3 polar covalent bonds.
- (d) 1 ionic bond, 1 coordinate bond, 3 nonpolar covalent bonds.

3. Which of the following molecules can have its central atom accept a “Free electron pair” to form a covalent bond?

(Atomic numbers: H=1, N=7, Al=13, P=15, Cl=17)

- (a) CH_4
- (b) NH_3
- (c) AlCl_3
- (d) PH_3



Q1/ Compare (AsH_3 - CCl_2F_2) in terms of:

(The spatial shape of the molecule, the number of free electron pairs and bonding electron pairs – the abbreviated formula)

Q2/ State the scientific reason:

- Hydrogen proton cannot be found free in water

Q3/ Choose the correct answer: -

1- When a water molecule H_2O combines with a hydrogen proton H^+ to form a Hydronium ion H_3O^+

- Which of the following changes occur in the spatial shape and angle value Between the bonds?

- (a) The shape changes from (angular) to (Tribase pyramid) and the angle value Increases
- (b) The shape changes from (angular) to (Triagonal planar) and the angle value Decreases.
- (c) The shape changes from (linear) to (angular) and the angle value increases.
- (d) The shape changes from (Tribase pyramid) to (tetrahedron) and the angle value Decreases.

2-Which of the following expresses the type and number of bonds in the Ammonium bromide molecule NH_4Br ?

- (a) 1 ionic bond, 2 coordinate bonds, 2 polar covalent bonds.
- (b) 2 ionic bonds, 1 coordinate bond, 2 polar covalent bonds.
- (c) 1 ionic bond, 1 coordinate bond, 3 polar covalent bonds.
- (d) 1 ionic bond, 1 coordinate bond, 3 nonpolar covalent bonds.

3-Which of the following molecules has the least repulsion between the pairs of Valence electrons around its central atom?

- (a) CH_4
- (b) NH_3
- (c) H_2O
- (d) SO_2



Home performance (Week 6)

Q1/ choose the correct answer:-

1- Which of the following is an ore of two elements from (S) block?

- (a) Halite ore
- (b) Carnallite ore
- (c) Sylvite
- (d) Apatite

2- Which of the following expresses the electronic structure of alkali elements?

- (a) $(n-1) d^{10}, n s^1$
- (b) $n s^1$
- (c) $n s^2$
- (d) $n p^1$

3- Three alkali metals (X-Y-Z) when burned in pure oxygen produce the following oxides: $(Z O_2 - Y_2 O_2 - X_2 O)$

-Which of the following is correct?

- (a) Element (Z) is likely to be (Rb)
- (b) $X > Y > Z$ (according to their chemical activity)
- (c) $X > Y > Z$ (their oxidation numbers)
- (d) $X_2 O$ is considered an oxidizing agent

4- Three unknown salts X, Y, and Z were exposed to a non-illuminated flame, and The observations were as follows:

X: The flame turned crimson red.

Y: The flame turned golden yellow.

Z: The flame turned light purple.

- Which of the following choices represent the salts (Z, Y, X)?

- A) X: Sodium chloride , Y : Lithium chloride , Z: Potassium chloride.
- B) X: Lithium chloride , Y : Sodium chloride , Z: Potassium chloride.
- c) X: potassium chloride , Y : sodium chloride , Z: lithium chloride
- d) X: lithium chloride , Y : potassium chloride, Z: sodium chloride

5- Which of the following reactions does not produce oxygen gas?

- (a) Dissolving KO_2 in hydrochloric acid
- (b) Dissolving RbO_2 in water
- (c) Reaction of potassium superoxide with carbon dioxide gas
- (d) Combustion of lithium metal in oxygen, then dissolving the product in water



6- Which of the following expresses the oxidation number of the metal (M) in its superoxide (MO_2)?

- (a) $\frac{1}{2}+$ (b) $1+$ (c) $\frac{1}{2}-$ (d) $2-$

7- Element (X) is an alkali metal that burns in oxygen to form an oxide containing The anion O^{2-}

-Which of the following represents element (X) or the resulting oxide?

- a) The small ionic size of ion (X) prevents it from forming other oxides.
b) The oxidation number of element (X) in the oxide ($2+$)
c) Element (X) is used in the manufacture of photoelectric cells
d) The resulting oxide is a strong oxidizing agent

8- Which of the following choices expresses the correct order of alkali metal According to their strength as reducing agents?

- a) $\text{Rb} < \text{K} < \text{Na} < \text{Li}$ b) $\text{Li} < \text{K} < \text{Na} < \text{Rb}$
c) $\text{Na} < \text{Rb} < \text{K} < \text{Li}$ d) $\text{Li} < \text{Na} < \text{K} < \text{Rb}$

9- Dry test can be used to detect alkali metals in their salts, where each of them emits light with a wavelength and frequency specific to each element.

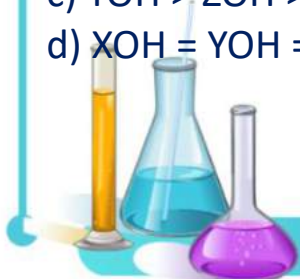
-Which of the following expresses the reason for the emission of the characteristic spectrum of each element?

- a) Excitation of electrons in their atoms from a lower energy level to a higher Energy level.
b) Return of excited electrons to their ground energy levels.
c) Transfer of electrons from their atoms to the atom of a non-metallic element to form salt.
d) Transfer of electrons in their atoms from the (ns) level to the (np) level.

10- Three consecutive elements (Z, Y, X) are in group 1 (1A). The one with the lowest atomic number is (X). Element (Z) burns in pure oxygen under pressure to produce an oxide containing the anion (O_2^{1-}).

- Which of the following expresses the correct order of the hydroxides of these elements according to alkaline property?

- a) $\text{XOH} > \text{YOH} > \text{ZOH}$
b) $\text{ZOH} > \text{YOH} > \text{XOH}$
c) $\text{YOH} > \text{ZOH} > \text{XOH}$
d) $\text{XOH} = \text{YOH} = \text{ZOH}$



Weekly assessment (Week-6)

A

Q1/ State the scientific reason:

1. Potassium superoxide (KO_2) is considered a strong oxidizing agent?

.....

.....

Q2/ The following table shows the electronic distribution of three elements from group (1A).

Electronic configuration	Element
$[\text{He}] 2s^1$	A
$[\text{Ne}] 3s^1$	B
$[\text{Ar}] 4s^1$	C

- Using the table above:

1- Which of the above elements can form an oxide that plays a role in purifying The air of carbon dioxide?

2- Which of the above elements can be extracted from Halite ore?

Q3- Choose the correct answer:

1-It is difficult to obtain oxide (M_2O_2) from burning one of alkali metals (M) With pure oxygen.

- Which of the following choices represents element M?

a) It is in the second period and, when burned, produces an oxide with an Oxidation number of oxygen = 2-

b) It is in the third period and, when burned, produces an oxide with an Oxidation number of oxygen = 1-

c) It is in the second period and is considered the biggest atomic radius in its group

d) It is located in the third period and is considered the smallest atomic radius In its group

2-From the corresponding diagram:

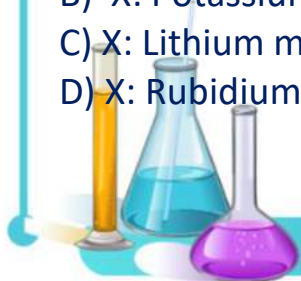
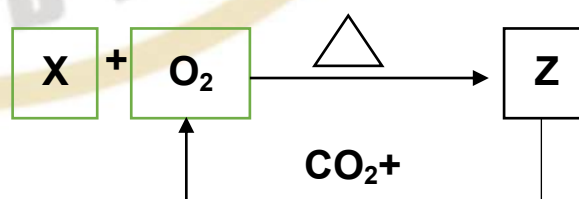
Which of the following choices represent Element (X) and compound (Z)?

A) X: Sodium metal, Z: Sodium superoxide.

B) X: Potassium metal, Z: Potassium superoxide.

C) X: Lithium metal, Z: Lithium oxide.

D) X: Rubidium metal, Z: Rubidium carbonate.



Q1/ State the scientific reason:

2- Potassium superoxide can be used to purify enclosed spaces from carbon Dioxide gas.

Q2/ The following table shows the electronic distribution of three elements from group (1A).

Electronic configuration	Element
[Ar] 4s ¹	A
[Kr] 5s ¹	B
[Xe] 6s ¹	C

- Using the table above:

- 1- Which of the above elements its oxide (MO₂) dissolves in water and Produces the strongest alkali?.....
- 2- Which of the above elements can be extracted from Carnallite ore?

Q3- Choose the correct answer:

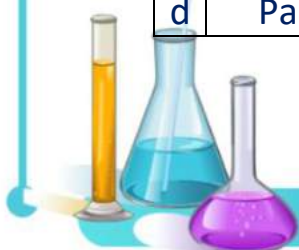
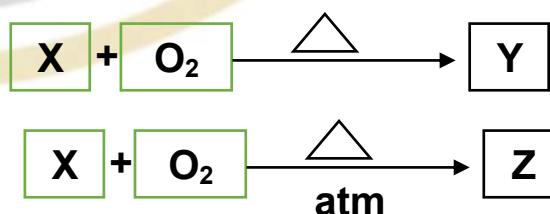
1- Element (M) of the first group, when exposed to a non-illuminated flame, Turns blue -violet-.

-Which of the following options describes element M?

- a) It is in the third period and ranks sixth in abundance in nature.
- b) It is in the fourth period and when burned in pure oxygen, produces an oxide with Oxidation number of oxygen (1-)
- c) It is in the sixth period and ranks sixth in abundance in nature.
- d) It is in the sixth period and is used in photoelectric cells

2- Using the following diagram, which of the following choices represents the color of spectrum of element (X) and the formula of compounds (Y) and (Z)?

	Spectrum of (X)	Z	Y
A	Golden yellow	NaO ₂	Na ₂ O ₂
B	Pale violet	KO ₂	K ₂ O ₂
C	crimson	Li ₂ O ₂	Li ₂ O
d	Pale violet	K ₂ O ₂	KO ₂



Q1/ State the scientific reason:

1-Cesium metal is used in photoelectric cells.

Q2/ The following table shows the electronic distribution of three elements from group (1A).

Electronic configuration	Element
[Ne] 3s ¹	A
[Ar] 4s ¹	B
[Kr] 5s ¹	C

- Using the table above:

1-Which of the following elements requires a high temperature of up to 300°C To react with oxygen to form oxide (M₂O₂)

2- Which of the above elements are difficult to extract from their ores due to Their low concentration and high extraction costs?

Q3- Choose the correct answer:

1-Element (M) from the group (1A) can be extracted from halite ore.

-Which of the following represents element (M)?

- A) Located in the third period and ranks sixth in abundance in nature.
- B) Located in the fourth period and ranks seventh in abundance in nature.
- c) Located in the third period and its oxide is used to purify air from CO₂
- d) Located in the fourth period and is used in photoelectric cells

2-From the corresponding diagram:



-Using the previous diagram, which of the following expresses the electronic distribution of element (M) and the formula of compound (Y)?

	Electronic configuration of (M)	Formula of (Y)
A	[He] 2s ¹	Li ₂ O
B	[Ne] 3s ¹	Na ₂ O ₂
C	[Ar] 4s ¹	KO ₂
d	[Kr] 5s ¹	RbO ₂



Home performance (Week 1)

Q1/ choose the correct answer:-

1- Which of the following represents the combination of two atoms of an element whose atomic number (8)?

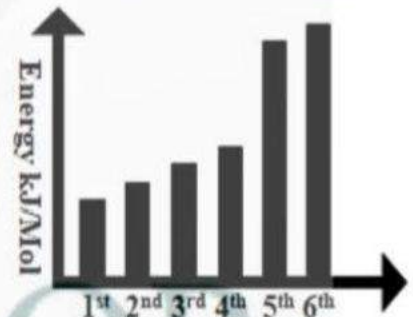
- (a) Each atom share by one electron
- (b) Each atom share by two electrons**
- (c) Ionic bond is formed
- (d) Physical bond is formed

2- Noble gases molecules consist of

- (a) One atom**
- (b) Two atoms
- (c) Three atoms
- (d) Four atoms



3-The opposite graphical figure shows the successive ionization potentials of an element (X), so the Lewis Dot – representation symbol of the element (Y) that Proceeds (X) in the same group are



- (a) $\cdot\dot{Y}\cdot$
- (b) $\cdot\ddot{Y}\cdot$**
- (c) $\cdot\ddot{Y}\cdot$
- (d) $\cdot\ddot{Y}\cdot$

4-Which of the following molecules contains the largest number of lone pairs of electrons?

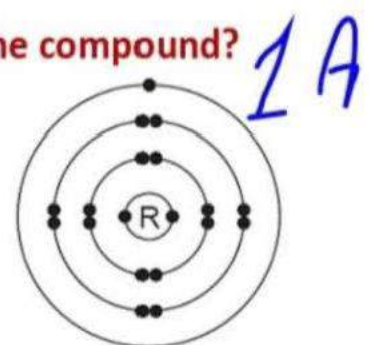
- (a) MgO
- (b) NaCl
- (c) MgCl₂**
- (d) Na₂O

5- The electronic structures of atoms Q and R are shown.

Q and R form an ionic compound, what is the formula of the compound?

- (a) QR₇
- (b) Q₂R₄
- (c) QR**
- (d) Q₇R

Handwritten note: **RQ**



6- A nonmetal (X) reacts with a metal (M) to give the formula M_2X . Which pairing below is most like elements represented by M and X?

(a) $_{20}\text{Ca}$ and $_{7}\text{N}$

(b) $_{7}\text{Li}$ and $_{16}\text{S}$

(c) $_{14}\text{Si}$ and $_{8}\text{O}$

(d) $_{37}\text{Rb}$ and $_{9}\text{F}$

7-Which of the following does not conduct electricity?

(a) $\text{NaCl}_{(\text{aq})}$

(b) $\text{KCl}_{(\text{l})}$

(c) $\text{MgCl}_{2(\text{s})}$

(d) $\text{LiF}_{(\text{aq})}$

8- Which of the following choices represents groups whose elements together form a strong ionic bond?

(A) 1A&2A

(B) 6A&7A

(C) 2A&4A

(D) 1A & 7A

9- Which of the following equations expresses an instantaneous reaction?

(a) $\text{NaCl}_{(\text{aq})} + \text{AgNO}_{3(\text{aq})} \rightarrow \text{NaNO}_{3(\text{aq})} + \text{AgCl}_{(\text{s})}$

(b) $\text{Zn}_{(\text{s})} + \text{H}_2\text{SO}_{4(\text{aq})} \rightarrow \text{ZnSO}_{4(\text{aq})} + \text{H}_{2(\text{g})}$

(c) $\text{N}_{2(\text{g})} + 3\text{H}_{2(\text{g})} \rightarrow 2\text{NH}_{3(\text{g})}$

(d) $\text{Fe}_{(\text{s})} + 2\text{HCl}_{(\text{aq})} \rightarrow \text{FeCl}_{2(\text{aq})} + \text{H}_{2(\text{g})}$

10-Metals tend to reach the electronic configuration of

(a) The inert gas that follows it in the periodic table

(b) The inert gas that precedes it in the periodic table

(c) The metal that is less chemically active than it

(d) The non-metal that is more chemically active than it



Weekly assessment (Week-1)

The element	Na	Al	Cl	Mg	K	F	O	P	H	S	N
Electronegativity	0.9	1.5	3	1.2	0.8	4	3.5	2.1	2.1	2.5	3
Atomic number	11	13	17	12	19	9	8	15	1	16	7

A

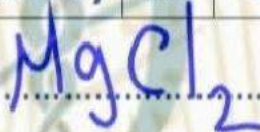


Q1/ State the scientific reason:

- 1- Molten and solutions of ionic compounds conduct electricity.
- 2- Metals and non-metals are chemically active, while noble gases are chemically inert.

Q2/ using the following table, write the chemical formula for an ionic compound:

element	Al	Cl	Mg
Electronegativity	1.5	3	1.2



Q3/ Choose the correct answer:

1- Which of the following compounds has the lowest ionic character?

- (A) Sodium chloride
- (B) Magnesium chloride
- (C) Potassium chloride
- (D) Aluminum chloride

2- Which of the following choices represents a physical bond?

- (A) Ionic bond
- (B) Covalent bond
- (C) Metallic bond
- (D) Coordination bond



B

Q1/ State the scientific reason:

due to the difficulty of ions movement within the crystal lattice resulting from the attractive forces between different ions

1- Ionic compounds do not conduct electricity in their solid state.

2- Electronegativity plays an important role in determining the type of bond.

Q2/ using the following table, write the chemical formula for covalent compound:

Because when the electronegativity difference between atoms is zero the bond is a pure Covalent and when that is between 0 and 0.4 the bond is non polar covalent and when is greater than 0.4 and less than 1.7 the bond is polar covalent and when is greater than 1.7 the bond is ionic.

element	Al	Cl	Mg
Electronegativity	1.5	3	1.2



Q3/ Choose the correct answer:

1- Which of the following compounds has the highest ionic character?

(A) Sodium chloride

(B) Magnesium chloride

(C) Potassium chloride

(D) Aluminum chloride

2- Which of the following choices represents a chemical bond?

(a) Van der Waals bonds

(b) Hydrogen bonds

(c) Metallic bonds

(d) Covalent bonds



Because The difference in electronegativity between potassium and chlorine (2.2) is greater than that between lithium and chlorine (2)

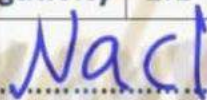
Q1/ State the scientific reason:

1- The ionic character in the compound KCl is higher than in the compound LiCl, to overcome the attraction forces between the cations and anions in the crystal lattice

2- Ionic compounds are characterized by high melting and boiling points.

Q2/ using the following table, write the chemical formula for the compound has a higher ionic property:

element	H	Cl	Na
Electronegativity	2.1	3	0.9



Q3/ Choose the correct answer:

1- Which of the following choices does not represent a chemical bond?

(A) Ionic bond

(B) Covalent bond

(C) Hydrogen bond

(D) Coordination bond

2- Which of the following compounds does not represent an ionic compound?

(A) Lithium chloride

(B) Magnesium chloride

(C) Potassium hydride

(D) Aluminum chloride



Weekly assessment (Week-2)



Because the linear molecular geometry of Carbon dioxide (CO_2) molecule makes its net dipole moment equal zero

Q1/ State the scientific reason:

Because They present in unionized form

1- Most of covalent compound compounds do not conduct electricity.

2- Carbon dioxide molecule is nonpolar

Q2/ Using the following elements $_{15}\text{A}$, $_{11}\text{B}$, $_{9}\text{C}$, $_{6}\text{D}$

- Which of them can form with hydrogen?

(1) Ionic compound

B

Compound $\rightarrow \text{BH}$

(2) Polar covalent compound

C

Polar covalent compound $\rightarrow \text{HC}$

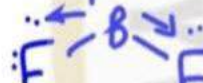
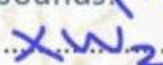
Q3/ The diagrams below represent Lewis electron dot- symbols of three

different elements:-



nonmetal

-Write the chemical formulas for the possible ionic compounds.



Because the planar Triangle stereo structure of boron trifluoride molecule makes its net dipole moment equal zero

Q1/ State the scientific reason:

due to the weak intermolecular attraction Forces between its molecules

1- Most covalent compounds are characterized by low boiling and melting points.

2- Boron trifluoride molecule is nonpolar

Q2/ Using the following elements $_{15}\text{A}$, $_{11}\text{B}$, $_{9}\text{C}$, $_{6}\text{D}$

- Which of them can form with hydrogen?

(1) Non-polar covalent compound

D

Compound $\rightarrow \text{DH}_4$

(2) Covalent compound whose molecule contains three bond pairs and one lone pair

A

Compound $\rightarrow \text{H}-\text{A}-\text{H}$

Q3/ The diagrams below represent Lewis electron dot- symbols of three

different elements:-



nonmetal

-Write the chemical formula for a molecule contains 10 lone pairs of electrons

And 3 bond pairs



$$\text{A} = 5 + (7 \times 3) = 26 \bar{e}$$

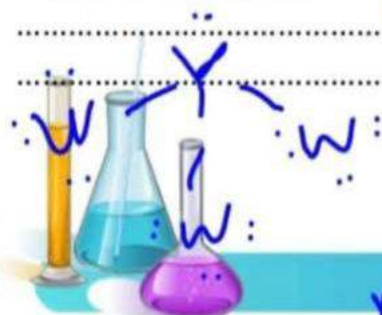
$$\text{B} = (1 \times 8) + (3 \times 8) = 32 \bar{e}$$

$$\text{C} = 32 - 26 = 6 \bar{e}$$

$$\text{D} = \frac{6}{2} = 3$$

$$\text{E} = \frac{26 - 6}{2} = 10 \bar{e}$$

no. of lone pairs



Because the difference in electronegativity between Hydrogen atom and chlorine atom is greater than 0.4 and less than 1.7 so chlorine atom carry Partial negative charge and Hydrogen atom carry partial positive charge

Q2/ State the scientific reason:

1- Hydrogen chloride molecule polar is

2- Ammonia gas dissolves in water to a greater extent than carbon dioxide gas.

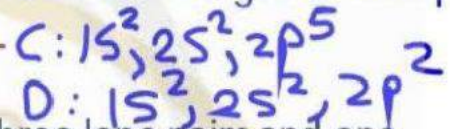
Because Ammonia gas is polar molecule while Carbondioxide gas is non polar molecule

Q3/ Using the following elements ¹⁵A, ¹¹B, ⁹C, ⁶D

- Which of them can form with hydrogen?

(1) Covalent compound whose molecule contains three lone pairs and one bond pair **C**

(2) Covalent compound whose molecule contains four bond pairs..... **D**



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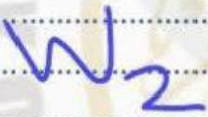
Q3/ The diagrams below represent Lewis electron dot- symbols of three different elements:-

metal $\dot{x} \cdot$

nonmetal $\cdot \ddot{y} \cdot$

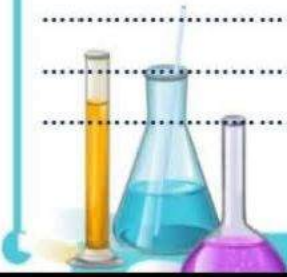
nonmetal $\cdot \ddot{w} \cdot$

-Write the chemical formula for The propable pure Covalent molecules from the previous element



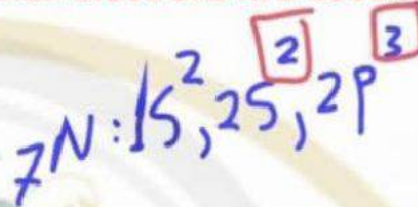
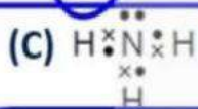
(non metal atoms)

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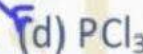
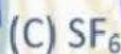
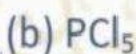
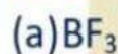
Q1/ choose the correct answer:-

1- Which electron arrangement for the outer shell electrons in a covalent compound is correct?

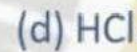
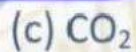
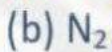


there is no lone pair on N atom

2- Which of the following molecules has a central atom that does not reach the electronic configuration of a noble gas and is surrounded by the largest number of bond pairs?



3- Which of the following choices represents a nonpolar molecule with the largest number of lone pairs?



4- Which of the following statement about a molecule NH_3 is correct?

(a) Each hydrogen atom donates a pair of electrons to a nitrogen atom X

(b) There are double covalent bonds between the nitrogen atom and the hydrogen Atom X

(c) There are single covalent bonds between its hydrogen atoms X

(d) There are three shared pairs of electrons in the molecule

5- Which of the following choices explains the polarity of hydrogen chloride molecules?

(a) Complete transfer of electrons to the chlorine atom.

(b) Displacement of the electron cloud toward the more electronegative atom Without complete transfer.

(c) The difference in electronegativity between hydrogen and chlorine is 0.4.

(d) The linear spatial shape of the molecule.

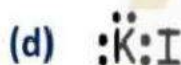
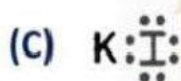
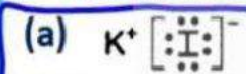
Cl atom has higher electronegativity than H
Cl carry $(-\delta)$ charge and H carry $(+\delta)$ charge

6- Which of the following molecules has the highest solubility in polar solvents such as water?

- (a) CH_4 non Polar
(b) Cl_2 non Polar
(c) CO_2 non Polar
(d) NH_3 Polar

Like dissolve like

7- Which Lewis dot structure represents bonding in potassium iodide?



Ionic compound
metal $\text{K} : [\text{Ar}] 3s^1$ lose e^-
non metal $\text{I} : [\text{Kr}] 5s^2, 4d^{10}, 5p^5$ gain e^-

8- The idea behind "covalent drugs" in treating viruses is based on:

- (a) Forming temporary ionic bonds with the virus protein. ~~X~~
(b) Covalent bonding with the virus protein to inhibit its action. ✓
(c) Increasing the molecular mass of the virus to make it easier to detect.
(d) Breaking covalent bonds within the infected cell.

9- The device used to estimate the molecular mass of a covalent drug before and after it binds to the virus protein is:

- (a) An electron microscope.
(b) A mass spectrometer. ✓
(c) An atomic absorption spectrometer.
(d) A sensitive balance.

10- Which of the following reactions is expected to be the "fastest" under standard conditions?

- (a) The reaction of hydrogen gas molecules with chlorine gas molecules to form a Polar HCl molecule.
(b) The reaction of sodium chloride (NaCl) solution with silver nitrate solution to form A precipitate. *instantaneous*
(c) The reaction of a covalent drug with a viral protein to form a permanent covalent Bond.
(d) The reaction of methane gas (CH_4) with oxygen (combustion).





Weekly assessment (Week-3)

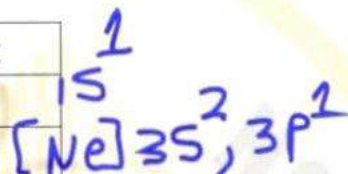
Q1/ State the scientific reason:

- Valence Bond Theory (based solely on the concept of atomic orbital overlap) was unable to explain the structure of the 'Boron Trifluoride' molecule. Because the boron atom contains an orbital with a single electron whereas it must contain three orbitals, each with single electron.



Q2/ Using the following table:

Atomic number	Element
1	X
13	Y
16	Z
17	W



1- Write the chemical formula of the compound formed by the combination of Element (Y) and element (W). Does it obey the Octet Rule? Explain why.

YW_3 Because Y atom is surrounded by 6 electrons.

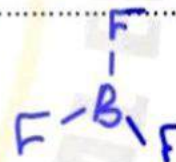
2- According to the Valence Bond Theory (VBT), identify the atomic orbitals Involved in forming the bond in the molecule (XW).

1s of X atom and 3p of W atom

Q3/ Choose the correct answer: -

1- Which of the following is true for boron trifluoride: -

- a) Obeys to the octet rule. ~~X~~
- b) Its bonds can be explained by the concept of orbital overlap. ~~X~~
- c) Obeys to the octet rule, and its bonds can be explained by V.B.T in its simplest form. ~~X~~
- d) does not obey to octet rule, and its bonds cannot be explained by V.B.T in its simplest form.



2- Which of the following options describes the phosphine molecule PH_3 ?

- a) Does not obey to octet rule, and the bond is formed by the overlap of the (s) orbital of the (H) atom with the single electron orbital of the (P) atom. ~~X~~
- b) Obeys to the octet rule, and the bond is formed by the overlap of the (s) orbital of the (H) atom with the orbital containing a single electron from the (P) atom.
- c) Obeys to the octet rule, and the bond is formed by the overlap of the (s) orbital of the (H) atom with the (s) orbital of the (P) atom. ~~X~~
- d) Does not obey to octet rule, and the bond is formed by the overlap of the (s) orbital of the (H) atom with the (s) orbital of the (P) atom, which has a single electron. ~~X~~



Q1/ State the scientific reason:

- The octet theory does not apply to the NO_2 molecule.

Because the total number of valence electrons in its atoms is an odd number

Q2/ Using the following table:

Atomic number	Element
1	X
13	Y
16	Z
17	W

1- Write the chemical formula for the element (W). Does the octet rule apply to it, and why?



Because each W atom is surrounded by 8 electrons

2- According to the valence bond theory, identify the atomic orbitals that form the bond in the molecule (X_2)

1s of X atom and 1s of X atom

Q3/ Choose the correct answer: -

1- Which of the following options describes the beryllium chloride molecule BeCl_2 :-

a) Does not obey to octet rule, and its bonds cannot be explained by the simple Concept of orbital overlap.

b) Does not obey to octet rule, and its bonds can be explained by the simple Concept of orbital overlap.

c) Obeys to the octet rule and its bonds can be explained by the simple Concept of orbital overlap.

d) Obeys to the octet rule, and its bonds cannot be explained by the simple Concept of orbital overlap.

2- Which of the following statements correctly describes the phosphorus chloride molecule PCl_3

a) Does not obey to octet rule, and the bond is formed by the overlap of the (p_x) Orbital of the (Cl) atom with the orbital containing a single electron of the (P) atom.

b) Does not obey to octet rule, and the bond is formed by the overlap of the (p_z) Orbital of the (Cl) atom with the orbital containing a lone electron of the (P) atom

c) Obeys to the octet rule and the bond is formed by the overlap of the (p_z) orbital of The (Cl) atom with the orbital containing a single electron from the (P) atom

d) Obeys to the octet rule, and the bond is formed by the overlap of the (p_x) orbital of The Cl atom with the orbital containing a single electron of the (P) atom.



Q1/ State the scientific reason:

1- Failure of the concept of simple atomic orbital overlap to explain the bonds in the BeF_2 molecule

Because Be atom don't have orbitals with single electrons.....

Q2/ Using the following table:

Atomic number	Element
1	X
13	Y
6	Z
17	W

$1s^1$

$1s^2, 2s^2, 2p^2$
 $[Ne] 3s^2, 3p^5$

p_x, p_y, p_z
 $\uparrow \uparrow \uparrow$

1- Write the chemical formula for a compound consisting of elements (Z) and (X) That obeys to octet rule.

ZX_4

$X-\frac{1}{2}-X$

2- According to the valence bond theory, identify the atomic orbitals that form The bond in the molecule (XW).

$1s$ of X atom and $3p_z$ of W atom

u, d, d
 d, p, d

Q3/ Choose the correct answer: -

1- Which of the following describes (PCl_5) molecule?

- a) Obeys to octet rule, and its bonds cannot be explained by the simple concept of V.B.T
- b) Its bonds can be explained by simple concept of V.B.T
- c) Obeys to octet rule and its bonds can be explained by simple concept of V.B.T
- d) Does not obey to octet rule, and its bonds cannot be explained by simple concept of V.B.T

2- Which of the following statements correctly describes the hydrogen fluoride Molecule HF?

$H-\ddot{F}:$

- a) The octet theory does not apply to it, and its bonds arise from the overlap of the (s) Orbital of hydrogen with the (s) orbital of the fluorine atom.
- b) Obeys to octet rule, and its bonds arise from the overlap of the (1s) orbital of Hydrogen with the ($2p_z$) orbital of the fluorine atom.
- c) Obeys to octet rule and its bonds arise from the overlap of the (1s) orbital of Hydrogen with the (2s) orbital of the fluorine atom.
- d) Does not obey to octet rule, and its bonds arise from the overlap of the (1s) orbital Of hydrogen with the ($2p_z$) orbital of the fluorine atom.



Home performance (Week 3)

Q1/ choose the correct answer:-

(1) Which of the following molecules doesn't obey the octet rule?

a) CH_4

b) NH_3

c) NO_2

d) H_2O

Handwritten notes:
 $7\text{N}: 1s^2, 2s^2, 2p^3$ (5)
 $8\text{O}: 1s^2, 2s^2, 2p^4$ (6)
 $5+6+6=17$ odd number

2-Using the following table:

Group number	The element
15	X
13	Y
16	Z

-Which of the following compounds has central atom that follow the octet Rule?

(a) XCl_3 and YCl_3

(b) YCl_3 and ZCl_2

(c) XCl_3 and ZCl_2

(d) XCl_3 only

Handwritten notes:
 $[\text{Ne}] 3s^2, 3p^1$
 (Y) atom is surrounded by 6 electrons

3 - Given that the molecular formulas of the chlorides of elements (A) and (B) are (ACl_3) and (BCl_2) respectively, and both obey the octet rule;

-which of the following choices represents the valence shell electron Configuration for elements (A) and (B)

(a) A: ns^2, np^1 , B: ns^2, np^4

(b) A: ns^2, np^3 , B: ns^2, np^4

(c) A: ns^2, np^5 , B: ns^2, np^2

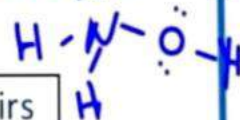
(d) A: ns^2, np^5 , B: ns^2, np^4



Handwritten notes:
 A has 5 valence electrons
 B has 6 valence electrons



4- Which of the following choices represents Hydrazine molecule ($\text{H}_2\text{N}-\text{O}-\text{H}$)?
($1\text{H}, 7\text{N}, 8\text{O}$)



	Number of lone pairs	Number of bond pairs
a	4	3
b	3	4
c	3	2
d	2	3

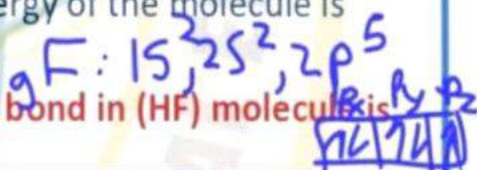


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5- The hydrogen molecule reaches a state of stability when the two hydrogen atoms approach each other to a distance at which:

- a) The electron density is as high as possible and the energy of the molecule is Greater than the sum of the energies of its atoms.
- b) The electron density is as low as possible and the energy of the molecule is less Than the sum of the energies of its atoms.
- c) The electron density is as high as possible and the energy of the molecule is less Than the sum of the energies of its atoms.
- d) The electron density is as low as possible and the energy of the molecule is Greater than the sum of the energies of its atoms.

6- According to the Valence bond theory, the covalent bond in (HF) molecule is formed as a result of:



- a) The overlap of the ($1s$) orbital of the hydrogen atom with the ($2p_z$) orbital of the Fluorine atom
- b) The overlap of the ($1s$) orbital of the hydrogen atom with the ($2p_x$) orbital of the Fluorine atom
- c) The fluorine atom reaching a stable state by surrounding itself with eight Electrons through sharing.
- d) The overlap of the ($1s$) orbital of the hydrogen atom and the orbital ($2p_x$) of the Fluorine atom element (X) has 6 valence electrons.

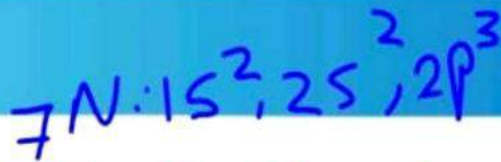
7- Element (X) has 6 valence electrons.

all of the following compounds of element (X) obey the Electronic Theory of Valency EXCEPT:"

- a) H_2X
- b) XF_2
- c) XF_6
- d) XCl_2



X is surrounded by 12 electrons



8- According to the Valence bond theory, the covalent bond in ammonia (NH_3) is Formed as a result of:

- a) The overlap of the (1s) orbital of the hydrogen atom with the single electron Orbital of the nitrogen atom
- b) Contact between the energy level (K) of the hydrogen atom and the energy Level (L) of the nitrogen atom
- c) The nitrogen atom reaching a stable state by surrounding itself with eight Electrons through sharing.
- d) Overlap of the (1s) orbital of the hydrogen atom with the (2s) orbital of the Nitrogen atom

9- Which of the following molecules did the simple concept of covalent bonding fail to explain?

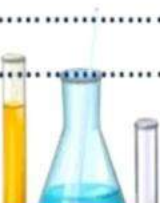


- a) H_2
- b) BeF_2
- c) HF
- d) Cl_2



10- Which of the following choices represents Hydrazine molecule (H_2N-NH_2)? ($1H, 7N, 8O$)

	Number of lone pairs	Number of bond pairs
a	4	3
b	3	4
c	2	6
d	2	5



Home performance (Week 4)

Q1/ choose the correct answer:-

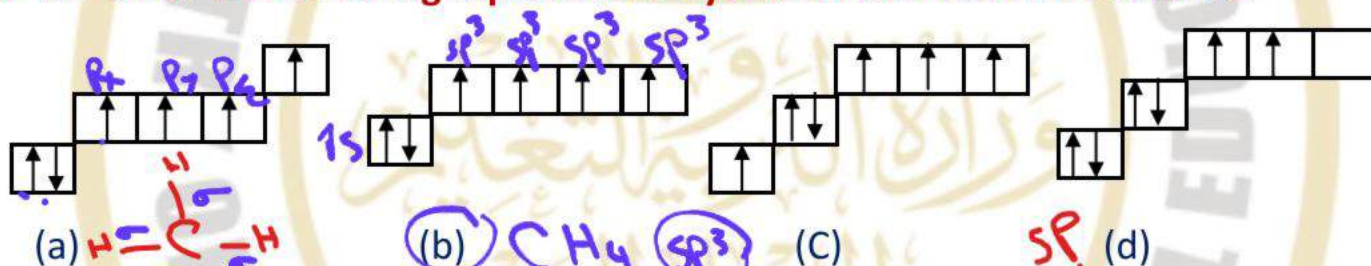
1- The hybrid orbital is.....

- (a) More active and less protruded
- (b) More protruded and less capable to overlapping
- ☒ (c) More protruded and more capable to overlapping
- (d) Less active than a pure orbital

2-All of the following are conditions for hybridization except:

- (a) It occurs between orbitals of the same atom
- (b) It occurs between orbitals that are close in energy
- ☒ (c) The electrons of the atom must be excited
- (d) The number of orbitals entering = the number of orbitals resulting.

3- Which of the following represents a hybrid carbon atom in methane?



4- Which of the following choices expresses the orbitals involved in the formation of sigma (σ) bonds in hydrogen cyanide ($\text{H}-\text{C}\equiv\text{N}$)?

	Sigma bond between (C) and (H)	Sigma bond between (C) and (N)
a	(p_y) of a carbon atom with (s) of a hydrogen atom	(p_y) of a carbon atom with (sp) of a nitrogen atom
b	(sp^2) of a carbon atom with (s) of a hydrogen atom	(sp) of a carbon atom with (sp^3) of a nitrogen atom
☒ c	(sp) of a carbon atom with (s) of a hydrogen atom ✓	(sp) of a carbon atom with (sp) of a nitrogen atom ✓
d	(p_z) from a carbon atom with (s) from a hydrogen atom	(sp^2) from a carbon atom with (sp^2) from a nitrogen atom

Sigma + lone = 2 sp
3 sp^2
4 sp^3 .





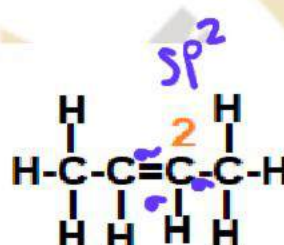
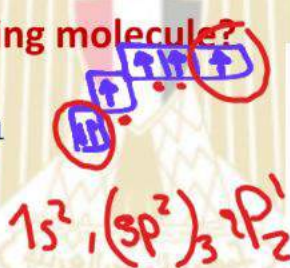
5- According to the V.B.T, which of the following expresses the readiness of an oxygen atom to form covalent bonds in a water molecule?

- A) Excitation of one of the electrons in the (2s) subshell, followed by (sp^2) Hybridization.
- ☒ b) No excitation of the subshell electron (2s) and hybridization of type (sp^3)
- c) Excitation of one of the subshell electrons (2s) followed by hybridization of type (sp^2)
- d) No excitation of the subshell electron (2s) and hybridization of type (sp^2)

6- Which of the following represents the electronic distribution of carbon atom

Number (2) in the corresponding molecule?

- ☒ (a) $1s^2, (sp^2)^1, (sp^2)^1, (sp^2)^1, 2p_z^1$
- (b) $1s^2, (sp^3)^1, (sp^3)^1, (sp^3)^1, (sp^3)^1$
- (c) $1s^2, (sp)^1, (sp)^1, 2p_y^1, 2p_z^1$
- (d) $1s^2, 2s^2, 2p^2$

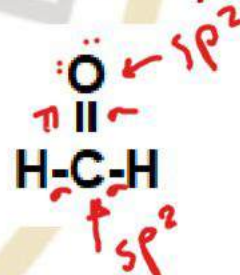


7- The sigma bond between the two carbon atoms in the ethylene molecule C_2H_4 is formed as a result of the overlap between the orbitals:

- (a) $1s^1$ & sp^3 ☒ (b) sp^2 & sp^2 (c) $1s^1$ & $1s^1$ (d) $1s^1$ & $2p_z^1$

8- Which of the following describes the orbitals involved in the formation of the sigma (σ) bond between the carbon atom and the oxygen atom in formaldehyde molecule shown in the figure?

- A) The sp^2 orbital of the carbon atom with the sp orbital of the Oxygen atom
- ☒ B) The sp^2 orbital of the carbon atom with the sp^2 orbital of the Oxygen atom.
- C) The overlap of the sp orbital of the carbon atom with the sp orbital of the Oxygen atom.
- D) The overlap of the sp^2 orbital of the carbon atom with the 2S orbital of the Oxygen atom.

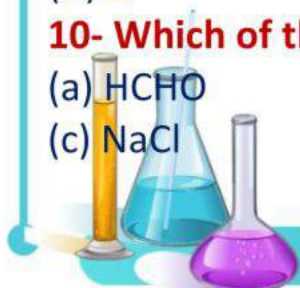
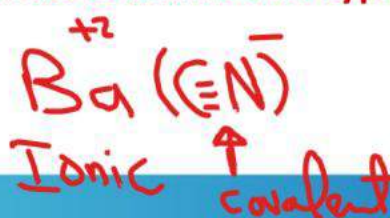


9- Which of the following choices expresses the number of pure orbitals involved in hybridization to produce sp^3d hybrid orbitals?

- (A) 3 (B) 4 ☒ (c) 5 (d) 6

10- Which of the following compounds contains two types of bonds?

- (a) HCHO ☒ (b) $Ba(CN)_2$
- (c) NaCl (d) PCl_3



Weekly assessment (Week-4)

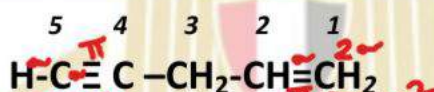
A

Q1/ State the scientific reason:

- Although a carbon atom has two unpaired electrons in its ground state, it forms four covalent bonds in a methane molecule.

Bec. it goes to excitation before hybridization

Q2/ Study the following compound well and then answer the following questions:



- 1- Identify the type of orbitals involved in the formation of the bond Between carbon atom (1) and hydrogen atom

1 s and sp²

- 2- What is the number of pi bonds and the number of electron densities around carbon Atom number (5)?

2 π , electron densities 2

Q3/ Choose the correct answer: -

(5A)

- 1- Element (X) is located in group (15) of the periodic table. When forming the molecule XH₃

X = N

- Which of the following expresses the type of hybridization in the central atom according to the valence bond theory?

A) sp³

B) sp²

c) No hybridization occurs

d) sp



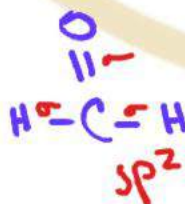
- 2- The central atom in all of the following compounds undergo SP² hybridization except:

A) C₂H₄ ✗

B) CH₂=CHCl ✗

C) HCHO ✗

D) H₂O ✓



- 3- Which pairs of the following compounds agree in the type of hybridization?

A) C₂H₄ - CO₂

B) NH₃ - BF₃

C) CH₄ - H₂O

D) BeCl₂ - H₂O



Q1/ State the scientific reason:

- No excitation occurs in the oxygen atom when water molecules are formed.

Bec. Oxygen doesn't contain any vacant orbitals

Q2/ Study the following compound well and then answer the following questions:



1- Identify the type of orbitals involved in the formation of the bond Between carbon atoms (3) and (4)

SP from C₄ and SP³ from C₃

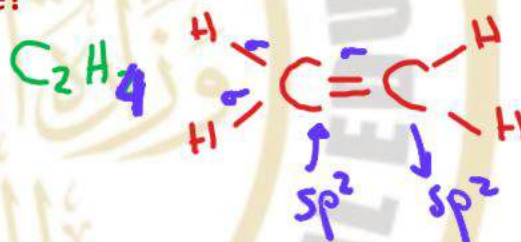
2- How many sigma bonds are there between carbon atoms and hydrogen atoms in the Molecule?

6 sigma bonds

Q3/ Choose the correct answer: -

1- Which of the following expresses the orbitals involved in the formation of bonds Between carbon atoms in the ethylene molecule?

- a) sp-sp is a sigma bond , p_y-p_y is a pi bond
 C) sp²-sp² is a sigma bond , p_y-p_y is a pi bond
 d) sp-sp is a sigma bond , p_z-p_z is a pi bond
c) sp²-sp² is a sigma bond , p_z-p_z is a pi bond



2- All of the following compounds undergo (sp) hybridization except:

- a) C₂H₆
 b) CH₃CCl
 c) CO₂
 d) C₂H₂



3- Which pairs of the following compounds do not agree in the type of hybridization of the central atom?

- a) CH₄ - C₂H₆ *sp³ ✓*
 b) H₂O - NH₃ *sp³*
c) BeCl₂ - H₂O
 d) CH₄ - NH₃

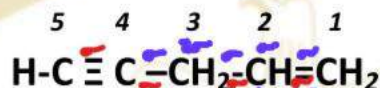


Q1/ State the scientific reason:

- No excitation occurs in the nitrogen atom when ammonia gas is formed

there is no vacant orbital in p sublevel in N atom

Q2/ Study the following compound well and then answer the following questions:



1- Identify the type of orbitals involved in the formation of the bond Between carbon atoms (2) and (3)

sp³ from C₃ and sp² from C₂

2- How many sigma bonds are there between carbon atoms in the molecule?

4. Sigma.

Q3/ Choose the correct answer: -

6A

1- Element (X) is located in group (16) of the periodic table. When forming the H₂X molecule

- Which of the following expresses the type of hybridization in the central Atom according to the valence bond theory?

a) sp³

b) sp²

c) No hybridization occurs

d) sp



2- All of the following compounds undergo SP³ hybridization except:

a) CH₄ *X sp³*

b) H-C≡N

c) NH₃

d) H₂O



3- Which pairs of compounds agree in the type of hybridization of the central Atom?

a) C₂H₂ - BeCl₂ *sp*

b) NH₃ - BF₃

c) C₂H₄ - H₂O

d) BeCl₂ - H₂O



Home performance (Week 5)



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Q1/ choose the correct answer:-

1- Which of the following expresses a central atom that cannot form a Coordinate bond?

(a) AX_5E_2

(b) AX_3

(c) AX_2E

(d) AX_3E

there is no any lone pairs

2- Which of the following expresses the coordinate bond in a fluoroborate ion (BF_4^-)?

	Donor atom or ion	Acceptor atom or ion
A	Boron atom donates ($2e^-$) from orbital (sp^2)	Fluoride ion accept ($2e^-$) in orbital ($3s$)
B	Fluoride ion donates ($2e^-$) from sublevel ($2p$)	Boron atom accept ($2e^-$) in orbital ($2P_z$)
C	Boron atom donates ($2e^-$) from orbital ($2s$)	Fluoride ion accept ($2e^-$) in orbital ($2s$)
d	Fluoride ion donates ($2e^-$) from level ($2s$)	Boron atom accept ($2e^-$) in orbital (sp^2)

3-Which of the following bonds do chemists consider being the "bond of life" and the Reason for the continuation of life on Earth?

(a) Metallic bond

(b) Covalent bond

(c) Ionic bond

(d) Hydrogen bond

4. The following table shows the boiling points of hydrogen halides:

Hydrogen halide	Boiling point
HF	19
HCl	-85
HBr	-67
HI	-35

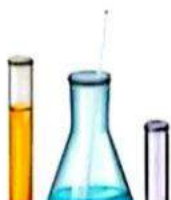
-Which of the following choices explains why hydrogen fluoride has a high Boiling point?

(a) HF molecules have a smaller dipole moment.

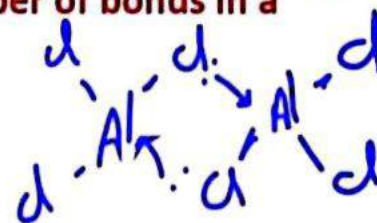
(b) HF is a stronger acid.

(c) HF is less soluble in water.

(d) HF molecules are bound by hydrogen bonds.

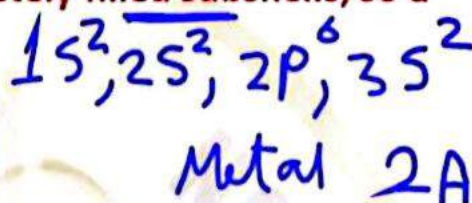


5- Which of the following expresses the type and number of bonds in a Molecule of liquid aluminum chloride Al_2Cl_6 ?



- (a) Six covalent bonds and two coordinate bonds
- (b) Six coordinate bonds and two covalent bonds
- (c) Three covalent bonds and one coordinate bond
- (d) Six covalent bonds and one coordinate bond

6. The atom of element (X) has only four completely filled subshells, so a sample of this element has bonds that are...



- (a) Pure covalent
- (b) Ionic
- (c) Metallic
- (d) Polar covalent

7- Three organic compounds (X, Y, Z) have the following chemical formulas:

X: $CH_3-CH_2-CH_2-CH_2-CH_3$ No hydrogen bond

Y: $CH_3-CH_2-CH_2-CH_2-OH$ 1

Z: $HO-CH_2-CH_2-CH_2-OH$ 2

- Based on your study of polarity and hydrogen bonding.

- Which of the following choices expresses the correct order of these compounds According to their degree of solubility in water?

- (A) $Z < Y < X$
- (B) $Y < Z < X$
- (C) $X < Y < Z$
- (d) $X < Z < Y$

8- Elements (X, Y) are from the third period:

(X): The number of valence electrons is half the number of electrons in the first energy level. $[Ne] 3s^1 \rightarrow 1A$

(Y): Its electron distribution ends with $3p^1$ $[Ne] 3s^2 3p^1 \rightarrow 3A$

- Which of the following is correct?

- (A) (Y): Its melting point is higher and its crystal is softer than (X)
- (B) (Y): Its melting point is lower and its crystal is harder than (X)
- (c) (Y): Its melting point is lower and its crystals are softer than (X).
- (d) (Y): Its melting point is higher and its crystals are harder than (X).

9- Which of the following expresses the relationship between bonds in a sample of hydrogen fluoride (HF)? *covalent*

- a) The bond between (H, F) atoms in the molecule is "shorter and stronger" than the bond between its molecules. *hydrogen bond*
- b) The bond between (H, F) atoms in the molecule is "longer and weaker" than the bond between its molecules.
- c) The bond between (H, F) atoms in the molecule is "shorter and weaker" than the bond between its molecules.
- d) The bond between (H, F) atoms in the molecule is "longer and stronger" than the bond between its molecules.

10- The following table shows the degree of hardness values of three metallic elements (X, Y, and Z) located in the third period of the periodic table according to the Mohs scale:

degree of hardness Mohs scale	Metallic element
2.75	(X) <i>3A</i>
0.5	(Y) <i>1A</i>
2.5	(Z) <i>2A</i>

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-Which of the following choices correctly represents the groups to which these elements belong?

	(X)	Y	Z
A	Group (3A)	Group (2A)	Group (2A)
B	Group (1A)	Group (1A)	Group (3A)
C	Group (2A)	Group (3A)	Group (1A)
d	Group (3A)	Group (1A)	Group (2A)



Weekly assessment (Week-5)

BeF_2

linear

$\text{F}-\text{Be}-\text{F}$

Zero

2 bond pair

AX_2

Q1/ Compare (CH_4 - BeF_2) in terms of:

- ① The spatial shape of the molecule, the number of free electron pairs and
③ bonding electron pairs – the abbreviated formula)

① Tetrahedral



② Zero

③ 4 bond pair

④ AX_4

Q2/ State the scientific reason:

- Dry hydrogen chloride gas does not affect on dry litmus paper, but it turns litmus paper wet with water to red. Because dry HCl gas consists of covalent molecules that don't contain Free hydrogen ions (H^+). However, in the presence of water the gas dissolves and ionizes forming hydronium ions which are responsible for the acidic properties that change the color of litmus Paper

Q3/ Choose the correct answer:

1- When ammonia molecules combine with hydrogen protons H^+ to form hydronium ions NH_4^+

- Which of the following changes occur in the spatial shape and angle value between the bonds?

(a) The shape changes from (angular) to (Triangular triangle) and the angle value Decreases.

(b) The shape changes from (linear) to (angular) and the angle increases.

(c) The shape changes from (angular) to (Tribase pyramid) and the angle increases.

(d) The shape changes from (Tribase pyramid) to (tetrahedral) and the angle increases.

2- Which of the following expresses the type and number of bonds in the ammonium hydroxide molecule NH_4OH ?

(a) 1 ionic bond, 1 coordinate bond, 3 polar covalent bonds.

(b) 1 ionic bond, 1 coordinate bond, 4 polar covalent bonds.

(c) 2 ionic bonds, 2 coordinate bonds, 3 polar covalent bonds.

(d) 1 ionic bond, 4 coordinate bonds, 1 nonpolar covalent bond.

3- Which of the following compounds can form hydrogen bonds between their molecules?

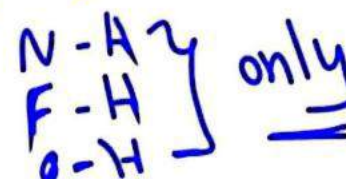
(a) PH_3 ✗

(b) AsH_3 ✗

(c) NH_3

(d) CH_4 ✗

hydrogen bond



B

SO₂

BF₃

①

angular

planar triangle

②

$\text{O}=\text{S}=\text{O}$

$\text{F}-\text{B}-\text{F}$

③

one

zero

②

2

3

④

AX₂E

AX₃

Q1/ Compare (SO₂ – BF₃) in terms of:

- ① The spatial shape of the molecule, the number of free electron pairs and bonding electron pairs – the abbreviated formula)

Q2/ State the scientific reason:

- Hydrogen chloride gas dissolved in benzene does not conduct electricity, whereas its solution in water conduct electricity.
- Benzene is a non polar solvent. when HCl dissolves in benzen, it remains in the form of covalent molecules and doesn't dissociate into ions while water is a polar solvent. when HCl dissolves in water, it completely ionized into hydronium ions and chloride ions. The presence of These ions allow the solution To conduct electricity

Q3/ Choose the correct answer:-

1-When a third phosphorus fluoride molecule PF₃ combines with a fluorine atom (or proton) to form a phosphorus tetrafluoride ion PF₄⁺, which of the following Changes occur in the spatial configuration and angle value of the central atom?

- (a) The shape changes from a (Triangular planar) to (Tribase pyramid), and the angle Value decreases.
- (b) The shape changes from an (Angular) to a (Tribase pyramid), and the angle value Increases.

(c) The shape changes from a (Tribase pyramid) to a (tetrahedron) and the angle Value increases.

(d) The shape changes from a (Tribase pyramid) to an (angular) shape and the Angle value remains constant.

2- Which of the following expresses the type and number of bonds in the ammonium chloride molecule NH₄Cl?

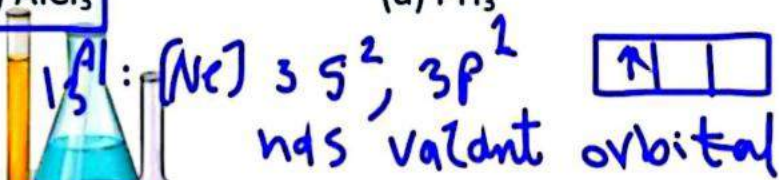
- (a) 1 ionic bond, 2 coordinate bonds, 2 polar covalent bonds.
- (b) 2 ionic bonds, 1 coordinate bond, 2 polar covalent bonds.
- (c) 1 ionic bond, 1 coordinate bond, 3 polar covalent bonds.
- (d) 1 ionic bond, 1 coordinate bond, 3 nonpolar covalent bonds.



3. Which of the following molecules can have its central atom accept a "Free electron pair" to form a covalent bond?

(Atomic numbers: H=1, N=7, Al=13, P=15, Cl=17)

- (a) CH₄
- (b) NH₃
- (c) AlCl₃
- (d) PH₃



Q1/ Compare (AsH_3 - CCl_2F_2) in terms of:

- ① The spatial shape of the molecule, the number of free electron pairs and
③ bonding electron pairs – the abbreviated formula)

②	1 pair	Zero
③	3	4
④	AX_3E	AX_4

Q2/ State the scientific reason:

- Hydrogen proton cannot be found free in water because of their bonding with water molecules by coordinate bonds forming hydronium ions

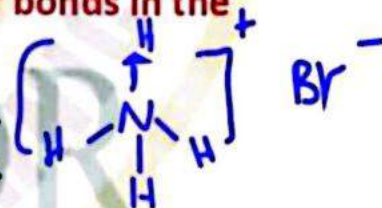
Q3/ Choose the correct answer: -

- 1- When a water molecule H_2O combines with a hydrogen proton H^+ to form a Hydronium ion H_3O^+ angular $\text{H}-\ddot{\text{O}}-\text{H} \rightarrow [\text{H}-\ddot{\text{O}}-\text{H}]^+$ Tribase pyramid
- Which of the following changes occur in the spatial shape and angle value Between the bonds?

- (a) The shape changes from (angular) to (Tribase pyramid) and the angle value Increases
(b) The shape changes from (angular) to (Triagonal planar) and the angle value Decreases.
(c) The shape changes from (linear) to (angular) and the angle value increases.
(d) The shape changes from (Tribase pyramid) to (tetrahedron) and the angle value Decreases.

2-Which of the following expresses the type and number of bonds in the Ammonium bromide molecule NH_4Br ?

- (a) 1 ionic bond, 2 coordinate bonds, 2 polar covalent bonds.
(b) 2 ionic bonds, 1 coordinate bond, 2 polar covalent bonds.
(c) 1 ionic bond, 1 coordinate bond, 3 polar covalent bonds
(d) 1 ionic bond, 1 coordinate bond, 3 nonpolar covalent bonds.



3-Which of the following molecules has the least repulsion between the pairs of Valence electrons around its central atom?

- (a) CH_4 bond pair - bond pair

(b) NH_3

(c) H_2O

(d) SO_2

lone pair - lone pair > lone pair - bond pair > bond pair - bond pair





Home performance (Week 6)

Q1/ choose the correct answer:-

1- Which of the following is an ore of two elements from (S) block?

- (a) Halite ore ~~(b) Carnallite ore~~ **KCl.MgCl₂.6H₂O**
(c) Sylvite (d) Apatite

2- Which of the following expresses the electronic structure of alkali elements?

- (a) $(n-1) d^{10}, n s^1$
~~(b) $n s^1$~~
(c) $n s^2$
(d) $n p^1$

3- Three alkali metals (X-Y-Z) when burned in pure oxygen produce the following oxides: $(Z O_2 - Y_2 O_2 - X_2 O)$

- Which of the following is correct?

- ~~(a) Element (Z) is likely to be (Rb)~~
(b) $X > Y > Z$ (according to their chemical activity)
(c) $X > Y > Z$ (their oxidation numbers)
(d) $X_2 O$ is considered an oxidizing agent

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4- Three unknown salts X, Y, and Z were exposed to a non-illuminated flame, and The observations were as follows:

- X: The flame turned crimson red. **Li**
Y: The flame turned golden yellow. **Na**
Z: The flame turned light purple. **K**

- Which of the following choices represent the salts (Z, Y, X)?

- A) X: Sodium chloride , Y: Lithium chloride , Z: Potassium chloride.
~~B) X: Lithium chloride , Y: Sodium chloride , Z: Potassium chloride.~~
C) X: potassium chloride , Y: sodium chloride , Z: lithium chloride
D) X: lithium chloride , Y: potassium chloride, Z: sodium chloride

5- Which of the following reactions does not produce oxygen gas?

- (a) Dissolving KO_2 in hydrochloric acid
(b) Dissolving RbO_2 in water
(c) Reaction of potassium superoxide with carbon dioxide gas
~~(d) Combustion of lithium metal in oxygen, then dissolving the product in water~~





6- Which of the following expresses the oxidation number of the metal (M) in its superoxide (MO_2)?

- (a) $\frac{1}{2}+$ ~~(b) 1+~~ (c) $\frac{1}{2}-$ (d) 2-

7- Element (X) is an alkali metal that burns in oxygen to form an oxide containing The anion O^{2-}

-Which of the following represents element (X) or the resulting oxide?

- ~~a) The small ionic size of ion (X) prevents it from forming other oxides.~~
b) The oxidation number of element (X) in the oxide (2+)
c) Element (X) is used in the manufacture of photoelectric cells
d) The resulting oxide is a strong oxidizing agent

8- Which of the following choices expresses the correct order of alkali metal According to their strength as reducing agents?

- a) $\text{Rb} < \text{K} < \text{Na} < \text{Li}$ b) $\text{Li} < \text{K} < \text{Na} < \text{Rb}$
c) $\text{Na} < \text{Rb} < \text{K} < \text{Li}$ ~~d) $\text{Li} < \text{Na} < \text{K} < \text{Rb}$~~

9- Dry test can be used to detect alkali metals in their salts, where each of them emits light with a wavelength and frequency specific to each element.

-Which of the following expresses the reason for the emission of the characteristic spectrum of each element?

- a) Excitation of electrons in their atoms from a lower energy level to a higher Energy level.
~~b) Return of excited electrons to their ground energy levels.~~
c) Transfer of electrons from their atoms to the atom of a non-metallic element to form salt.
d) Transfer of electrons in their atoms from the (ns) level to the (np) level.

10- Three consecutive elements (Z, Y, X) are in group 1 (1A). The one with the lowest atomic number is (X). Element (Z) burns in pure oxygen under pressure to produce an oxide containing the anion (O_2^{1-}).

- Which of the following expresses the correct order of the hydroxides of these elements according to alkaline property?

- a) $\text{XOH} > \text{YOH} > \text{ZOH}$
~~b) $\text{ZOH} > \text{YOH} > \text{XOH}$~~
c) $\text{YOH} > \text{ZOH} > \text{XOH}$
d) $\text{XOH} = \text{YOH} = \text{ZOH}$

Mohamed El-Sayed



Weekly assessment (Week-6)

A

Q1/ State the scientific reason:

1. Potassium superoxide (KO_2) is considered a strong oxidizing agent?

Because it reacts with water and acids
to form hydrogen peroxide and oxygen.

Q2/ The following table shows the electronic distribution of three elements from group (1A).

Electronic configuration	Element
$[\text{He}] 2s^1$ Li	A
$[\text{Ne}] 3s^1$ Na	B
$[\text{Ar}] 4s^1$ K	C

- Using the table above:

1- Which of the above elements can form an oxide that plays a role in purifying the air of carbon dioxide? C

2- Which of the above elements can be extracted from Halite ore? B

Q3- Choose the correct answer:

Halite is NaCl

1- It is difficult to obtain oxide (M_2O_2) from burning one of alkali metals (M) with pure oxygen.

- Which of the following choices represents element M?

a) It is in the second period and, when burned, produces an oxide with an Oxidation number of oxygen = 2-

b) It is in the third period and, when burned, produces an oxide with an Oxidation number of oxygen = 1-

c) It is in the second period and is considered the biggest atomic radius in its group

d) It is located in the third period and is considered the smallest atomic radius in its group

2- From the corresponding diagram:

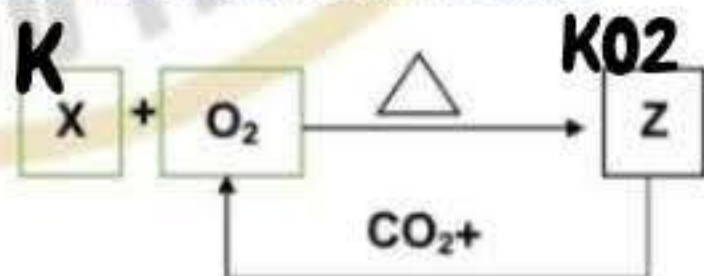
Which of the following choices represent Element (X) and compound (Z)?

A) X: Sodium metal, Z: Sodium superoxide.

B) X: Potassium metal, Z: Potassium superoxide.

C) X: Lithium metal, Z: Lithium oxide.

D) X: Rubidium metal, Z: Rubidium carbonate.



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Q1/ State the scientific reason:

2- Potassium superoxide can be used to purify enclosed spaces from carbon Dioxide gas.

Because it reacts with carbon dioxide gas to form oxygen

Q2/ The following table shows the electronic distribution of three elements from group (1A).

Electronic configuration	Element
[Ar] 4s ¹ K	A
[Kr] 5s ¹ Rb	B
[Xe] 6s ¹ Cs	C

- Using the table above:

1- Which of the above elements its oxide (MO₂) dissolves in water and Produces the strongest alkali?.....**C**

2- Which of the above elements can be extracted from Carnallite ore?.....**A**

Q3- Choose the correct answer:

1- Element (M) of the first group, when exposed to a non-illuminated flame, Turns blue -violet-.

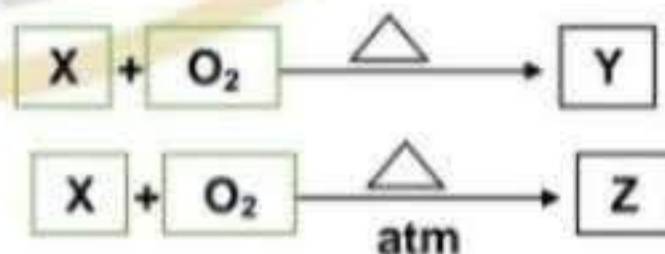
Cs

-Which of the following options describes element M?

- It is in the third period and ranks sixth in abundance in nature.
- It is in the fourth period and when burned in pure oxygen, produces an oxide with Oxidation number of oxygen (1-)
- It is in the sixth period and ranks sixth in abundance in nature.
- ☒ It is in the sixth period and is used in photoelectric cells

2- Using the following diagram, which of the following choices represents the color of spectrum of element (X) and the formula of compounds (Y) and (Z)?

	Spectrum of (X)	Z	Y
A	Golden yellow	NaO ₂	Na ₂ O ₂
B	Pale violet	KO₂	K₂O₂
C	crimson	Li ₂ O ₂	Li ₂ O
d	Pale violet	K ₂ O ₂	KO ₂



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Q1/ State the scientific reason:

1-Cesium metal is used in photoelectric cells.

Due to its large radius, electronegativity, and the ease with which electrons are released from its surface when light falls upon it.

Q2/ The following table shows the electronic distribution of three elements from group (1A).

Electronic configuration	Element
[Ne] 3s ¹ Na	A
[Ar] 4s ¹ K	B
[Kr] 5s ¹ Rb	C

- Using the table above:

1-Which of the following elements requires a high temperature of up to 300°C To react with oxygen to form oxide (M₂O₂) **A**

2- Which of the above elements are difficult to extract from their ores due to Their low concentration and high extraction costs? **C**

Q3- Choose the correct answer:

1-Element (M) from the group (1A) can be extracted from halite ore.

-Which of the following represents element (M)? **Na**

- ☒ A) Located in the third period and ranks sixth in abundance in nature.
- ☐ B) Located in the fourth period and ranks seventh in abundance in nature.
- ☐ c) Located in the third period and its oxide is used to purify air from CO₂
- ☐ d) Located in the fourth period and is used in photoelectric cells

2-From the corresponding diagram:



-Using the previous diagram, which of the following expresses the electronic distribution of element (M) and the formula of compound (Y)?

	Electronic configuration of (M)	Formula of (Y)
A	[He] 2s ¹	Li ₂ O
B	[Ne] 3s¹	Na₂O₂
C	[Ar] 4s ¹	KO ₂
d	[Kr] 5s ¹	RbO ₂

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كيفية طباعة صفحات معينة من ملف معين مثلا ازاي نطبع الصفحات من صفحة 4 الى صفحة 9

